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Communications Engineering Digest/The Magazine of Broadband Technology

September 1982

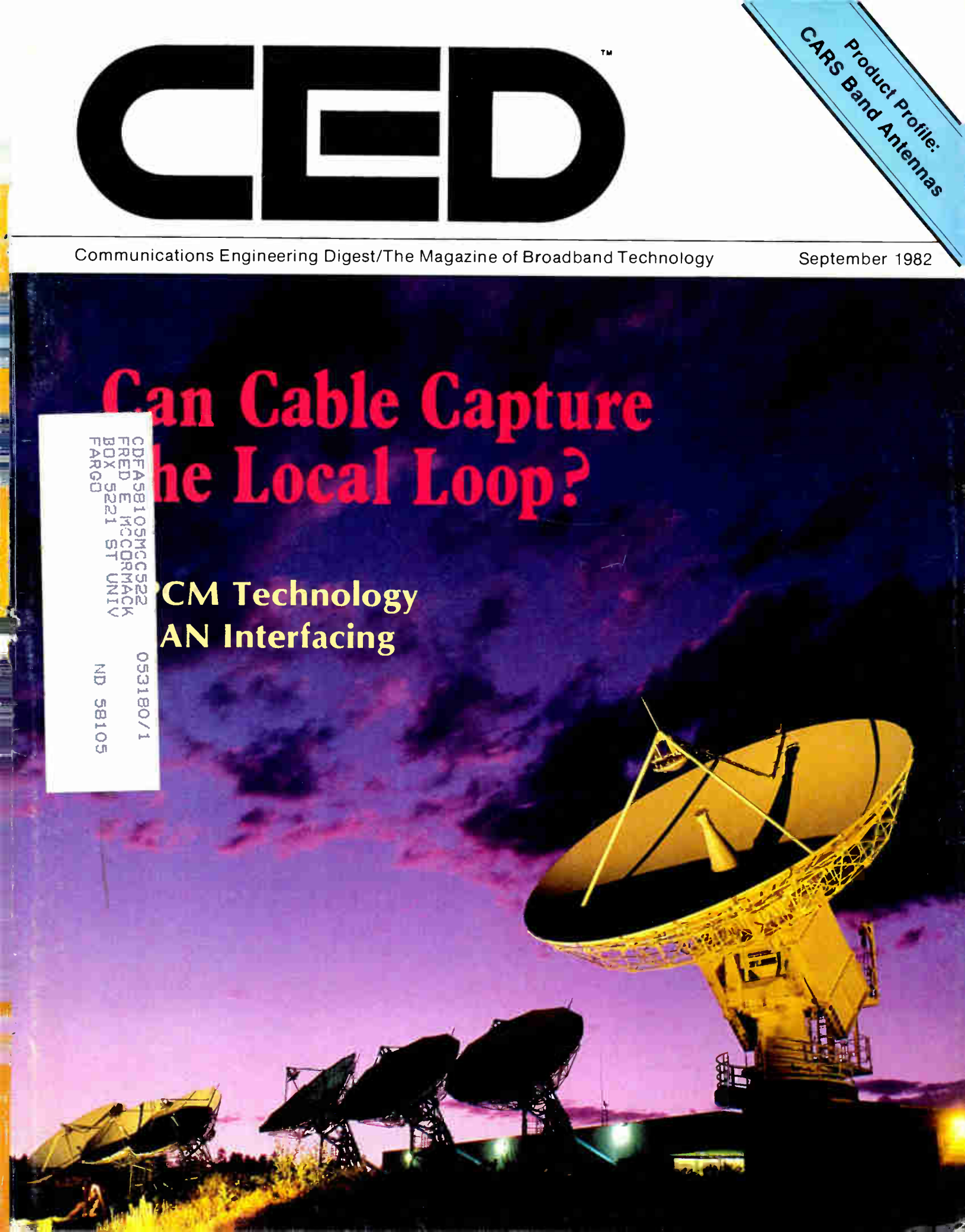
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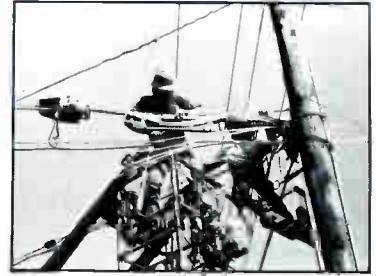
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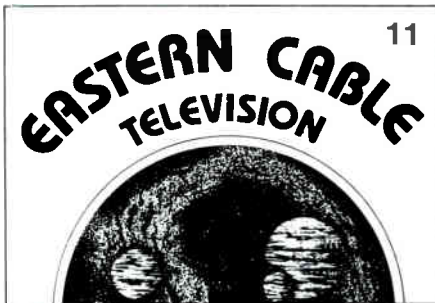


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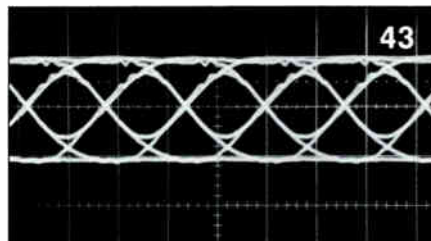
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CATV As The Local Loop In Business Data Transmission 29

When an institutional loop is constructed and its two-way capability is activated, the most promising opportunity for high revenue is in meeting the business community's needs for information transmission. As the technologies develop, cable operators stand the best chance of capturing this market.

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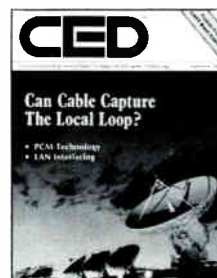
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About The Cover:

Satellite Business Systems' satellite tracking station in Castle Rock, Colo., represents cable's massive commitment to a future in business communications. Staff photo by Rob Stuehrk.



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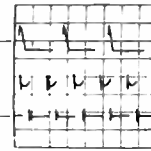
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Converter Confidence

With many converter manufacturers suffering bad press and gripes from system operators due to equipment problems, Pioneer Communications of America has announced an extended two-year warranty on all Pioneer BC-series standard converters. According to Pioneer officials, the BC-series has had a failure rate of less than 1 percent compared to the industry average of about 10 percent. "Our products are designed not to fail," said Pioneer President Bob Matsumoto. Well, whose are?

CATV vs. ARRL

The Federal Communications Commission has extended its filing deadline from Sept. 1 to Sept. 15 for submitting comments on a proposal that would preclude cable television operation on frequencies assigned to amateur radio service. A petition was recently filed with the FCC by the American Radio Relay League (ARRL) requesting rulemaking that would ban the cable industry from using frequencies between 108 MHz and 136 MHz (channel E), and 225 MHz and 300 MHz (channel K). The FAA has a running battle going as well, over the aeronautical frequencies.

Chip, Chip, Hooray

Memory chips (about 90 cents worth of silicon chips) may solve international videotex compatibility problems. That's the recommendation from the State Department's U.S. National Committee of the International Consultative Committee (CCITT). The recommendation will go to the Nov. 16-26 meeting of the CCITT in Geneva which will discuss international standards for terminal equipment. The U.S. National Committee accepted the reports of two study groups that argued the viability of using memory chips that incorporate character sets of all existing systems standards.

E.T. —Out Of This World

It may seem somewhat alien, but AT&T has no interest in having E.T. phone home. AT&T has the rights to use the E.T. character, the wide-eyed extraterrestrial from the movie of the same name, to promote telephone usage, but has no plans to do so. Although unconfirmed, speculation has it the reason is the price. The figure E.T. is asking for is out of this world.

Big Bundle

Cablenet, Inc., Mt. Prospect, Ill., claims they are installing the largest multiple cable run in the industry in that town. Cablenet's construction affiliate has assigned over 30 employees to the job. Construction of a particular section of plant required two bundles of 12 cables each, originating

directly from the headend, lashed to two support strand cables above ground. The run is both aerial and underground in an effort to reduce the visual impact of large cable bundles. In addition, the system's first 21 trunk amplifiers were housed in the largest pedestal in existence which had to be custom built for the Cablenet system.

Keeping Up

If you think you have trouble keeping up with the revolution in telecommunications, take heart, you're not the only one. President Reagan and his administration are also having some trouble in that area, according to Sen. Harrison Schmitt (R-N.M.). Schmitt spoke out at a Senate Commerce Committee confirmation hearing for presidential appointee Ronald Frankum (named as associate director of White House Office of Science and Technology Policy), saying, "There is no obvious understanding, in the administration as a whole, of what the revolution in telecommunications means." Schmitt complained the administration lacks a coherent policy toward science stating that telecommunications policy is "... in some areas a shambles," adding, "All I can do is shake my head."

Look Ma, No Glasses

The recent showing of three-dimensional movies on network television has rekindled memories of the 1950s when movie audiences *en masse* donned red and blue tinted glasses to see 3-D. Now, three professors from the University of South Carolina have invented a 3-D-TV system than can be viewed without the colored glasses. The system encodes the output of multiple television cameras, records the images on a standard VCR in a way that layers the foreground, middleground and background in differing degrees of focus and stability, rendering the illusion of depth. Its effects are not spectacular. "It's more like looking out a window," according to Prof. McLaurin, chairman of the USC Media Arts Department and co-inventor of the system. Playback is possible and tapes can be duplicated in the standard fashion.

Tunnel Radio

It's bad enough to be stuck in traffic inside a tunnel, but the fact that you cannot listen to your car radio due to line-of-sight interferences or static is enough to aggravate even the most laid back low-rider. Well, stand by for Tunnel Radio. In tunnels where Tunnel Radio is installed, motorists tuned to any AM station will receive the Tunnel Radio signal by the time they are a car's length past the portal. Tunnel Radio franchises already exist in Boston, Baltimore, and Fort Lauderdale, Fla., and it may soon be installed for New York's Holland, Lincoln, Midtown and Battery tunnels. Perhaps someone will come up with Tunnel Vision for bumper-to-bumper viewers.

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September

8: A workshop on "The Front Line Supervisor: The Key To Keeping Your Company Union-Free" sponsored by the **Society of Cable Television Engineers** will be held at the Atlanta Hilton. Contact the SCTE, (202) 293-7841.

9-11: The annual convention of the **Southern Cable Television Association**, the Eastern Show, will be held at the Georgia World Congress Center in Atlanta. Contact Nancy Horne, (404) 237-8228.

13-15: The annual fall convention of the **Wisconsin Cable Communications Association** will be held at the Concourse Hotel, Madison, Wis. Contact Tim Hanson or Lynne Walrath, (608)256-5299.

15-16: A **Blonder-Tongue** "Satellite TVRO Earth Station" seminar will be held in Lincroft, N.J. Contact George Chingery, (201) 679-4000.

15-16: "Emerging Trends in Digital Switching and Network Design" is the topic of a seminar sponsored by **Phillips Publishing Inc.** at The Palmer House in Chicago. Contact Stacey Schalton, (301) 986-0666.

15-17: **Magnavox CATV Systems** will be conducting a field training seminar with its Mobile Training Center in Boston. Contact Larry Richards, (315) 682-9105.

15-17: The sixth international fiber optics and communications exposition, **FOC '82**, will be held at the Los Angeles Marriott Hotel. Contact Information Gatekeepers, (671) 739-2022.

16: **Kable Information Services** is presenting a hands-on technical training and career seminar for the cable and satellite industries at the Holiday Inn, Jersey City, N.J. Contact Norman Adleman, (201) 353-1031.

19-22: The **Pacific Northwest Cable Communication Association** annual convention will be held at the Sea-Tac Red Lion Inn, Seattle. Contact Douglas Rice, (406) 245-3051.

20-22: **Magnavox CATV Systems** will be conducting a field training seminar with its Mobile Training Center in Boston. Contact Larry Richards, (315) 682-9105.

20-23: The annual convention of the **New England Cable Television Association** will be held at Dunfey-Hyannis Hotel in Hyannis, Mass. Contact Gary Cain, (603) 224-3373.

23-25: **Magnavox CATV Systems** will be conducting a field training seminar with its Mobile Training Center in Boston. Contact Larry Richards, (315) 682-9105.

26-28: The fall convention of the **Kentucky CATV Association** will be held at the Marriott Resort in Lexington. Contact Patsy Judd, (502) 864-5352.

27-29: The annual convention of the **Minnesota Cable Communications Association** will be held at the Radisson South Hotel in Bloomington. Contact Mike Martin, (612) 861-1166.

29-30: A **Blonder-Tongue** MATV/TVRO Earth Station Seminar will be held in Randolph, Mass., in conjunction with **W.A. Hendrickson Co.** Contact: Bob Hendrickson (617) 545-0652 or Gloria Rothfuss (201) 679-4000.

29-Oct. 1: **George Washington University** Center for Telecommunications Studies, in cooperation with the **FCC** and **NTIA**, is sponsoring a conference on "Radio Spectrum Management in a Period of Rapid Technological Change: The Government's Role" on the GW campus in Washington. Contact Brent Weingardt, (202) 676-8262.

29-Oct. 1: **Communications Technology Management Inc.** will host its third annual telecommunications conference, "The

Information Services Industry: Blueprint for Corporate Success," in Washington. Contact Regina Schewe, (703) 734-2724.

October

1: A conference on cable television interconnect in Massachusetts sponsored by the **Boston Health Care Cable Consortium, Boston University, The Communications Consortium, Emerson College, Northeastern University, the Massachusetts Cable Television Commission, University of Massachusetts** and **WGBH Educational Foundation** will be held at the Boston University Law Auditorium. Contact Barbara Cuggino, (617) 727-6925.

1-3: The **National Institute for Low Power Television** will sponsor the second annual **LPTV EAST Conference and Exhibition** at the Shoreham Hotel in Washington, D.C. For more information contact Joann Coviello, Conference Management Corporation, 17 Washington Street, P.O. Box 4990, Norwalk, Conn. 06856, (203) 852-0500.

4-8: An advanced technical training seminar sponsored by the **Community Antenna Television Association** will be held in Indianapolis. Contact the CATA Engineering Office, (305) 562-7847.

5-7: **1982 Western Design Engineering Conference**, sponsored by the Design Engineering Division of the **American Society of Mechanical Engineers**, will be held at the Anaheim Convention Center, Anaheim, Calif. For more information contact (212) 370-1100.

6, 7, 8: A **Blonder-Tongue** MATV/CATV/Earth Station Technical Seminar will be held in Miami, Fla. in conjunction with **Singer Products Co.**, Export Sales Representative. Contact Steve Schiffman (516) 683-3000 or Glenn Stawicki (201) 679-4000.

10-12: **UCLA**, in cooperation with the **Society of Cable Television Engineers**, will present a program on "Modern Telecommunications Networking" during the SCTE 1982 Fall Engineering Conference at the Don Cesar Beach Resort in St. Petersburg, Fla. Contact the SCTE, (202) 293-7841.

10-12: The **University of Wisconsin-Extension Communication Programs** and **Cable Television Information Center** are sponsoring a conference on "Upgrading Cable Systems: Renegotiation, Renewal, Rebuilding & Refranchising" at the Sheraton Inn, Madison, Wis. Contact Dr. Barry Orton, (608) 262-2394.

10-12: The **1982 SCTE Fall Engineering Conference** will be held at the Don Caesar Beach Resort Hotel in St. Petersburg, Florida. The conference will focus on Business and Data Communications on CATV Networks. For more information call the SCTE at (202) 293-7841.

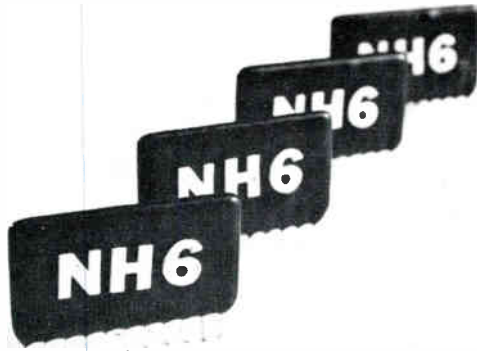
13: The **Iowa Cable Television Association** annual fall convention will be held at the Hilton Hotel in Des Moines. Contact Neil Webster, (319) 252-1343.

13-15: **Magnavox CATV Systems** will be conducting a field training seminar with its Mobile Training Center in Atlanta. Contact Larry Richards, (315) 682-9105.

16: **Kable Information Services** is presenting a hands-on technical training and career seminar for the cable and satellite industries at the Holiday Inn, Jersey City, N.J. Contact Norman Adleman, (201) 353-1031.

18-20: **Magnavox CATV Systems** will be conducting a field training seminar with its Mobile Training Center in Atlanta. Contact Larry Richards, (315) 682-9105.

19-20: The annual convention of the **Ontario Cable Telecom-**



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munications Association will be held at the Sheraton Triumph Hotel in Toronto. Contact the OCTA, (416) 481-4446.

19-21: The fall meeting of the **Alabama Cable Television Association** will be held at the Ramada Inn, Fort Walton Beach, Fla. Contact Otto Miller, (205) 758-2157.

19-21: The **Mid-America Cable TV Association's** 25th annual meeting and show will be held at the Tulsa Excelsior Hotel and Tulsa Assembly Center Arena in Tulsa, Oklahoma. For more information contact Rob Marshall (913) 887-6119.

20-22: Services by Satellite is sponsoring a conference on "Space Communications in the '80s" at the Washington Hilton Hotel. Contact (202) 331-1154 or 331-1960.

21-23: Magnavox CATV Systems will be conducting a field training seminar with its Mobile Training Center in Atlanta. Contact Larry Richards, (315) 682-9105.

22-24: The second annual convention of the **National Association of MDS Service Companies** will be held at the Sheraton Hotel in Washington, D.C. Contact Diane Hinte, (213) 532-5300; or Mark Edeman, (509) 328-0833.

27-28: A Blonder-Tongue "MATV/CATV/Earth Station" technical seminar will be held at the Hilton Airport Inn, Romulus Township, Mich., in conjunction with Robert Milsk Company Inc. Contact Ed Curreri, (513) 729-4392; or Robert Milsk, (313) 354-3310.

November

1-3: The **Community Antenna Television Association** will be holding a basic technical training seminar in Hot Springs, Arkansas. Contact the CATA Engineering Office, (305) 562-7847.

1-3: The 1982 Satellite Communications Symposium sponsored by **Scientific-Atlanta** will be held at the Marriott Hotel in Atlanta. Contact Betsy Crawley, (404) 449-2274; or John Feight, (404) 441-4800.

2, 3, 4: A **Blonder-Tongue MATV/CATV/Earth Station Technical Seminar** will be held in Palm Beach, Fla. in conjunction with Enjay Associates, Inc. Contact Glenn Stawicki or Floria Rothfuss (201) 679-4000.

8-9: A seminar on "Ku-Band Satellite Communications in the '80s" sponsored by **Phillips Publishing Inc.** will be held at the Hyatt Regency in Washington. Contact Stacey Schalton, (301) 986-0666.

8-10: A concentrated short course, "Digital Television-Bandwidth Reduction and Communication Aspects," will be presented by the **University of California, Berkeley.** Contact (415) 642-4151.

10-12: Magnavox CATV Systems will be conducting a field training seminar with its Mobile Training Center in St. Louis, Mo. Contact Larry Richards, (315) 682-9105.

15-17: Magnavox CATV Systems will be conducting a field training seminar with its Mobile Training Center in St. Louis, Mo. Contact Larry Richards, (315) 682-9105.

18-20: Magnavox CATV Systems will be conducting a field training seminar with its Mobile Training Center in St. Louis, Mo. Contact Larry Richards, (315) 682-9105.

30-Dec.1: Frost and Sullivan Inc. is presenting a seminar on "Understanding and Using CAD/CAM" in New York City. Contact Carol Sapchin, (212) 233-1080.

Looking ahead

October 10-12: SCTE Fall Engineering Conference, Don Caesar Beach Resort Hotel, St. Petersburg, Florida.

October 19-21: Mid-America Cable TV Association Convention, Excelsior Hotel, Tulsa, Oklahoma.

October 26-28: Atlantic Cable Show, Bally Park Place, Del Webb's Claridge and Brighton Hotels, Atlantic City, New Jersey.

November 17-19: Western Cable Show, Anaheim Convention Center, Anaheim, California.



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Editorial



Get Ready For The Long Haul

We do not hold the opinion that the cable television industry is in a recession or even being affected in a substantial way.

The industry has been getting some bad press lately, mainly from the general consumer press. Cynical reporters, bored and looking for some juicy bad news to report about an industry that disturbs their negative sensibilities and brightens up their otherwise gray view of the world, are quick to pounce upon anything that offers a gloom-and-doom perspective.

Granted, interest rates take their toll, equipment problems occasionally arise, some companies' stocks do not meet projections and programmers continue to take their expected losses for the time being. But the general and pervasive industry boom continues apace in spite of the deep recession the rest of the economy suffers.

There may be less of a boom than was wildly predicted earlier by analysts and consultants. But it must be borne in mind that the heady days of irresponsible "blue-sky" claims led to the intoxication. The level-headed remained skeptical when consultants inflated the numbers in order to convince the unwary they were missing out on the boom that only the consultants could key them into.

It's also true there are a number of new competing technologies making their appearance on the video transmission scene. DBS, MDS, STV and SMATV may have their place in the sun, but CATV has the jump on them. We agree with Andrew Inglis, president of RCA Americom, who recently said, "Don't believe it. Cable is easily the most economical and flexible method of delivering to the majority of homes in this country the largest selection of television signals. And I know of no technology on the horizon that will change this." Inglis went on to say, regarding the question of competition with DBS, that cable will win the competition, "hands down, except in rural and highly congested areas where it (cable) is prohibitively expensive. Cable was supposed to wipe out broadcasting, and it didn't."

Cable television will continue its successes as the preeminent method of transmission of entertainment services.

No other method can offer subscribers two-way interactive services such as residential security, energy management, videotex and gateway to databases.

For the business community, cable television systems can offer all these services as well as high-speed data transmission, both intra-city and inter-region, videoconferencing and other corporate management services. This market will mean another substantial revenue source for the cable operator (see cover article in this issue of **CED**).

Burt Harris, president of Harriscope, recently predicted, "Other services will impact upon cable only to prevent cable from reaching its absolute maximum penetration." Harris has cautioned operators that the most successful delivery system will be that system that arrives in a given market first.

There may be less of a boom for cable than was previously predicted by the consultants, but keep in mind that those who gave you the inflated numbers earlier to get you to buy their reports are the same ones who now seek to frighten you into buying their gloomy reports.

High interest rates have hampered cable construction but cable must be the first into the markets to meet the competition. That means we must get on with the franchising and construction processes. The high capitalization required can be leveraged by actively pursuing ancillary services for the general public and for the business community. Cable must also improve customer service, the point at which the subscriber can form a favorable or unfavorable opinion of the cable system.

The recession hasn't hit the cable industry. There are some poorly managed companies or poorly managed projects in some companies. We need to use this period of competition and financial turbulence to trim the fat and waste. This is an opportunity to get ready for the long haul.

A recession in the cable industry? As Harris pointed out, "We're in one of the few industries that is growing today. If you go to other industries' meetings, you can really get depressed."

George Sell

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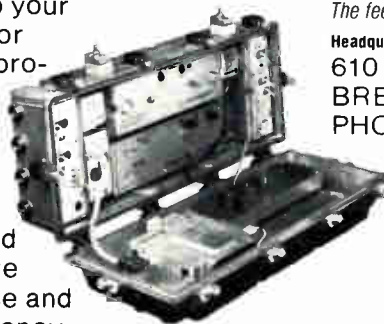
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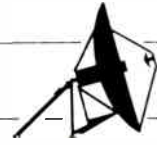
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FCC Kept Busy Schedule Prior To Summer Recess

The Federal Communications Commission made a host of decisions before closing shop for a summer recess. Two back-to-back meetings were held to take action on several issues, many dealing with Common Carrier Bureau items and international communications.

But perhaps the most significant event regarding the FCC happened in Congress. Both the House and Senate approved a budget reconciliation measure that contains a provision to reduce the FCC from seven to five commissioners. If signed by President Reagan, the agency will be headed by a five-member panel starting June 30, 1983. Opponents of the reduction plan claimed it was a retaliatory measure spurred by senators who were disgruntled with the White House's nomination of FCC General Counsel Stephen Sharp to a commission slot, rather than the nominee they preferred.

Other significant actions regarding the FCC include:

- The commission issued a notice of proposed rulemaking to eliminate or revise annual financial reports (Form 326) for cable operators.
- Ten transponders were authorized for GTE Satellite Corporations' United Satellite Television, a DBS project designed to deliver five channels of programming with both East and West Coast feeds. The transponders are on a Telesat Canada bird.
- The National Burglar and Fire Alarm Association and the Central Station Electrical Protection Association have asked the FCC to initiate a rulemaking procedure to require owners of large two-way cable systems to make systems with 20 channels or more reserve at least one channel for alarm systems.
- The National Association of Broadcasters announced that it will appeal the FCC's ruling authorizing DBS services. The NAB filed with the U.S. Court of Appeals.
- The FCC extended its filing deadline from Sept. 1 to Sept. 15 for submitting comments on a proposal to preclude cable television operation on frequencies assigned to amateur radio services.
- FCC investigators have alleged that the National Spanish Television Network (SIN) is improperly controlling Spanish International Communications Corp., a licensee of five television stations. The commission said SIN, whose majority

ownership is controlled by Mexican interests, is serving as the program source and national ad sales representative for SICC. Foreign control of American broadcast outlets is prohibited under the Communications Act.

Satellite Users Conference Attracts Industry Enthusiasts

DENVER—The fourth annual Satellite Users Conference was held here Aug. 11-13 and was attended by some 1,500 industry enthusiasts and approximately 100 exhibitors. Sid Topol, president of Scientific-Atlanta, delivered the keynote address at the opening luncheon and identified scrambling, encryption and addressability as the biggest challenges to the satellite industry in the coming decade. Aside from booth traffic and a parking lot full of various types of send and receive antennas, general information sessions were held on all three days. Topics ranged from antenna and amplifier technology to SMATV, LPTV, space law, hotel networks, encryption systems and K-band technology.

TFC Mini-Hub FO System Launched in Miami; Others Being Tested

MIAMI—Storer Broadcasting Corp. in Pembroke Pines, Fla., a suburb of Miami, has the distinction of being the first cable system to activate a commercial computerized fiberoptic CATV system. The system will eventually provide interactive, addressable cable television services to Storer's Dade/Broward operation, now serving 46,000 subscribers. The Mini-Hub System is a fiberoptic, multi-unit dwelling distribution system developed by Times Fiber Communications Inc.

Chairman Peter Storer said, "The Broward Mini-Hub system will serve as the focal point for our development of this system concept which can be applied to the 123 cable operations in our organization." Also on hand for the activation celebration held at the Park Place Condominiums in Pembroke Pines was TFC Chairman Lawrence DeGeorge, other TFC officials, the mayor and local officials.

Warner Amex Cable Communications is planning tests of the Mini-Hub system for possible use in its Columbus, Ohio, QUBE system and has installed one in a

15-story apartment complex for the testing program. United Cable Television Corp. is also testing the Mini-Hub system in a two building complex in New Britain, Conn., with a total of 155 units.

Times Fiber introduced the Mini-Hub System June 30, 1981. The configuration includes relatively inexpensive subscriber keypads that connect by a single optical fiber to a remotely located Local Distribution Unit (LDU) which handles TV channel selection and processing of transactional functions. Installed in a high-rise building, the system can interface with either fiberoptic feeder lines or coaxial cable.

RKO Radio Networks To Install ADDS With RCA And Scientific-Atlanta

NEW YORK—The RKO Radio Networks have announced a plan for the acquisition and installation of their own Audio Digital Distribution System (ADDS) using RCA's Satcom I satellite transponder space. Scientific-Atlanta has been selected to manufacture and install the equipment at the studio sites of a minimum of 300 RKO Radio Networks' affiliates. RKO will provide and install 3-meter earth stations, making RKO the first radio network company utilizing this digital system to make such a commitment for its affiliates.

ADDS will be fully operational by September 1, 1983, and will reflect a total network commitment of \$15 million for the combination of hardware and space segment.

The new system will provide RKO with six high quality digital 15 kHz audio channels of programming capability to affiliates. This increases the network's current 4-channel capacity on Westar III and allows for expanded programming options and future network growth.

The turn-key operation of manufacturing and installation will be contracted through Scientific-Atlanta.

FCC OKs Interim Rules For DBS

WASHINGTON—The green light is on for Direct Broadcast Satellite (DBS) service. The Federal Communications Commission has voted unanimously for interim rules that permit the licensing and operation of DBS in the 12 GHz band. The FCC opened up 500 MHz in the 12 GHz band for downlinks and 500 MHz in the 17 GHz band for uplinks. It set no ownership re-

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strictions, service restrictions or technical standards for the licensees whose terms are for 5 years.

The FCC action will permit construction to begin for the nine applicants already accepted. They are: Direct Broadcast Satellite Co., Western Union, Focus Broadcast Satellite Co., Video Satellite Systems, Graphic Scanning Corp., Hubbard Broadcasting, CBS, RCA and Comsat's Satellite Television Corp.. The rules are subject to the determinations of the 1983 Regional Administrative Radio Conference, which will structure orbit and frequencies for DBS in the Western Hemisphere.

The FCC did not rule out the possible use of DBS for high-definition television (HDTV). However, it did eliminate terrestrial HDTV in the 12 GHz band.

Under the new rules, terrestrial microwave users will have to relocate at their own expense, probably to the 12.7 to 13.25 GHz band, over a five-year period. If microwave users move slowly, DBS may be retarded in its growth. Some observers see the possibility that DBS operators may offer reimbursements to microwave users to speed up the change in frequencies.

General Instrument Gets DBS Nod

NEW YORK—General Instrument Corp. has received the necessary approvals from the FCC to begin a direct broadcast satellite service. The service is slated to launch in the northeastern U.S. sometime next year.

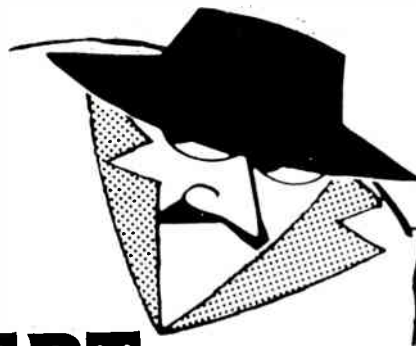
The company is already involved in cable through half-ownership of the Playcable games channel and its converter manufacturing division, but it will be branching out into new technologies with the DBS project.

General Instrument, which will supply the hardware for the four-channel service, will own a 12 percent minority interest in the project. Other owners of the service—to be called USTV—are Allstar Satellite Network and Pop Satellite Inc. They will supply programming for the operation.

Most of the details about programming and hardware have yet to be worked out, USTV spokesman Hal Krisburg said. He noted that by using transponder space on Canada's Anik C-2 satellite, scheduled to launch next year, the service will get a head start on other companies planning similar DBS systems. USTV will hold permanent transponder space on GTE's GSTAR when it is launched in 1984. The entire nation will be able to receive USTV by 1987, according to Krisburg.

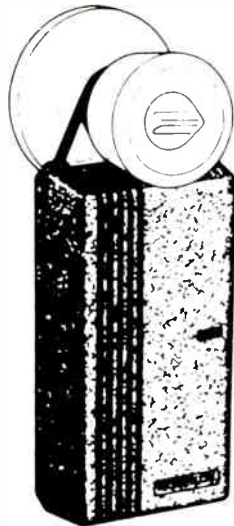
Cost of the service, which will have pay-per-view and teletext capabilities, has been set at \$30 per month, for programs and equipment leasing. Customers will be able to buy earth stations for approximately \$600 or rent the equipment

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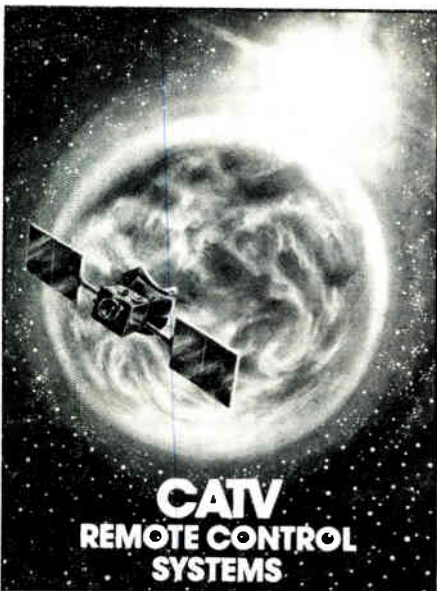
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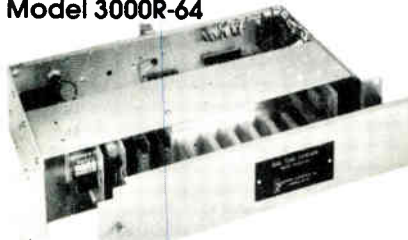
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also included model ALO5 auxiliary local oscillator modules and auxiliary/converter control monitors.

★ **Microdyne Corp.** has announced the signing of a contract with **Video Star Connections Inc.** Video Star is the leading independent supplier of satellite communication services for videoconferencing. They are installing the nationwide teleconferencing system for Marriott Hotels. Marriott will offer a nationwide network to permanently installed earth stations dedicated solely to teleconferencing. Video Star will manage and operate the network to provide end-to-end transmission of teleconferencing events. The first phase of the network will require 14 Microdyne fully redundant earth stations. The site locations will be at strategic locations throughout the country, with seven conveniently located at, or near, major airports.

★ **Octagon-Scientific Inc.** has announced an agreement for the manufacturing and delivery of 10,000 ROMAN, 450 MHz converters to **American Cablesystems Corp.** of Boston. According to the company, the RO-3R ROMAN units will be one-way addressable with remote control. The contract calls for scheduled deliveries beginning in November 1982, for use in existing American Cablesystems franchises.

★ **C-COR Electronics Inc.** reports record annual sales and earnings for the fiscal year ending June 30, 1982. Sales for the year were up 85 percent rising to \$24,434,000 compared to \$13,209,000 for last year. Net income increased 127 percent to \$3,346,000 from \$1,472,000 for last year. Earnings per share for fiscal 1982 were \$1.12 compared to \$.53 for the previous year, up 111 percent.

★ **PTS Corp.** has announced the opening of the newest and largest PTS cable rebuilding facility. Located in Martinsville, Ind., this 10,000 square foot facility is capable of handling 40,000 units each month. The Central CATV Products Rebuilding Center will serve the nation's largest independent and MSO system operators and will handle overflow from the satellite Servicenters. Converters currently being run at the Martinsville center include Jerrold, Oak, Hamlin, Technika, Standard, Sylvania, TOCOM, Pioneer, Magnavox, Phillips and others. Amplifiers currently being rebuilt include Scientific-Atlanta, Winegard, Jerrold, Channel Master and Blonder-Tongue.

★ A contract for a microwave distribution network that will bring educational television programming to the major portion of the state of Pennsylvania has been awarded to **Hughes Aircraft Company's** microwave communications products by the **Pennsylvania Educational Communications System (PECS)**. The contract, valued at more than \$1 million, calls for Hughes to design and build a 22-hop terrestrial distribution system that will

interconnect with the network that is already operational in a portion of the state. It will be a two-channel, bi-directional system, and is scheduled to be in operation by October of this year. The statewide distribution network, operated by PECS, will provide public access to educational programming via cable television systems throughout Pennsylvania. Plans call for an eventual expansion of the network to an eight-channel, bi-directional system serving more than 1.5 million subscribers.

★ **American Satellite and Television Inc.** is expanding its municipal and community operations with the addition of four new systems in the north central area of Florida. The company has been approved for franchises to build cable systems in McIntosh and Reddick and has reached agreement to acquire the existing CATV system in Hawthorne. ASTV will also build a system serving residents of a large condominium community in Boca Raton.

★ **Mucip Inc.** of Danbury, Conn., has been selected by **Group W** for the system construction of institutional facilities in its state-of-the-art Dearborn, Mich., system. Services will be rendered from Mucip's regional office in Westland, Mich.

★ **American Television and Communications Corp. (ATC)**, has reached an agreement in principle to acquire **People's Cable Company**, which owns and operates cable television systems in 12 communities surrounding Rochester, New York. Terms of the transaction were not disclosed. People's Cable is controlled by Harris Cable Corp.

★ The Society for Private and Commercial Earth Stations (**SPACE**) has announced the formation of the **Satellite Antenna Television Section (SAT Section)**, designed to specifically address the issues faced by those involved in installing and operating satellite earth station receivers on apartment houses, condominiums and other multi-unit dwellings. The SAT Section was established through a series of meetings at SPACE's recently-concluded convention and exhibition.

★ **Clarendon Cable Television Inc.** of Clarendon, Ark., has purchased a complete **Scientific-Atlanta** cable television system. The system includes two 4.6-meter satellite earth station antennas, a seven-bay, 400-MHz headend with reverse capacity, distribution equipment and coaxial cable. Also included in the system is an initial order for 500 set-top terminals with scrambling and remote control capability. The system is scheduled to be operational in August, 1982. Scientific-Atlanta has also received a \$2 million coaxial cable order from **Maclean Hunter Cable TV Inc.**, of Taylor, Mich. The order is for 500 miles of dual trunk and distribution cable to be used in the operator's construction of Pontiac and Waterford Township, Mich. Delivery began in May.



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CATV As The Local Loop In Business Data Transmission

When an institutional loop is constructed and its two-way capability is activated, the most promising opportunity for high revenue is in meeting the business community's needs for information transmission in the form of video, data and voice. As technologies develop, there will be strong competition in this market, but cable operators stand the best chance of all electronic media to capture it. In the following article, *CED* Editor George Sell examines the market, the technology and a recent applications demonstration that succeeded in establishing the viability of coast-to-coast, satellite-fed, high-speed data transmission employing CATV systems as the local loops.

By George Sell

Cable operators' potential revenues from local loop sources will exceed \$3 billion by the end of the decade and may reach as high as \$5 or \$6 billion by the year 2000. That estimate comes from a study prepared by the Yankee Group for the National Cable Television Association's 1982 Executive Seminar. To date, the only large "for profit" supplier of wideband local loop cable services, Manhattan Cable Television, shows 1980 revenues of \$1 million and 1981 revenues of \$1.6 million for those services, a growth of 60 percent, with a return on investment of well over 20 percent after taxes.

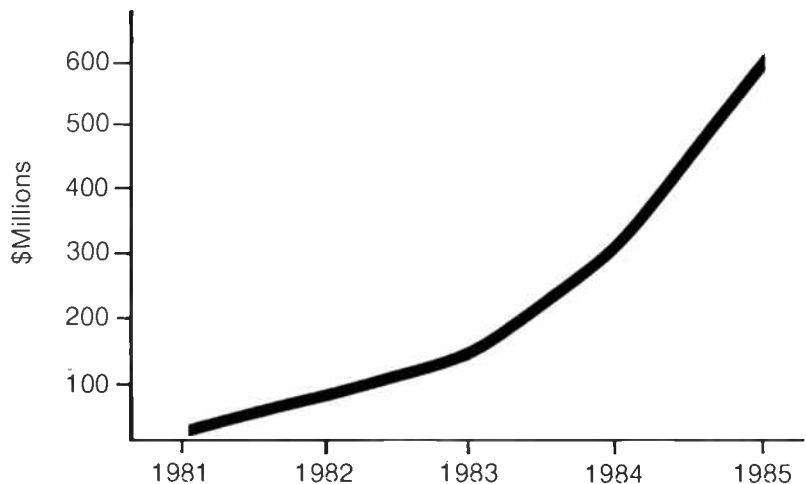
Market Potential

Further estimates of what's out there in terms of market potential can be gleaned from statistics relating to the telephone private leased lines. The Yankee Group estimates local private line revenue for 1985 to be \$1.35 billion, growing to \$3.32 billion in 1990. The cable industry's share in 1985 will be 15 percent or \$202 million, doubling in 1990 to 30 percent or \$996 million. Networks Resources Corporation, a subsidiary of Sytek, has analyzed the potential for inter-site business communications markets and estimates current revenue potential in a small city (less than

Figure 1 Private Broadband Local Area Networks (LANs)

Amdax Corp.	CableNet
The Destek Group	Desnet
Interactive Systems/	
3M Inc.	Videodata
Sytek Inc.	LocalNet
Ungermann-Bass Inc.	Net/One
Wang Laboratories Inc.	Broadband
	WangNet

Figure 2 LAN Growth



Source: The Yankee Group

100,000 homes) to be \$6 million annually.

Cable's share is going to come from high-speed data traffic, given the high bandwidth capacities of coax over twisted pair telco wire. Cable's channelization is 6 MHz, while the telco's are at 3+ kHz. Voice-grade telco wire has an upward data rate to 9600 bits per second while cable can operate from 300 B/s to billions.

Rates and capacities are not the only reasons that cable systems are more serviceable for point-to-point and point-to-multipoint data communications than telephone lines. The cable system "broadcasts" a ubiquitous signal throughout the system in a loop fashion, whereas the telephone is designed as a series of star connections. Satellite Business Systems, in a study of major cities, found that 50 percent of the present data communications market is point-to-point. Rogers Cablesystems found that in Portland, Ore., over 95 percent of the local data communications circuits operating at data rates of 1200 B/s or more are point-to-point or point-to-multipoint.

Productivity

Increased productivity is the impetus for businesses to seek office automation. Local Area Networks (LANs), the private networks (see figure 1) upon which office equipment such as data terminals, personal computers, printers, word processors, intelligent copiers, central processing units, high-speed fax machines, and the like, as well as teletext and video conferencing systems are integrated, are proliferating (see figures 2-4). LANs are baseband or broadband and utilize CATV off-the-shelf hardware. Indications are that the bandwidth requirements of businesses give rise to the preference for broadband LANs (see figure 5).

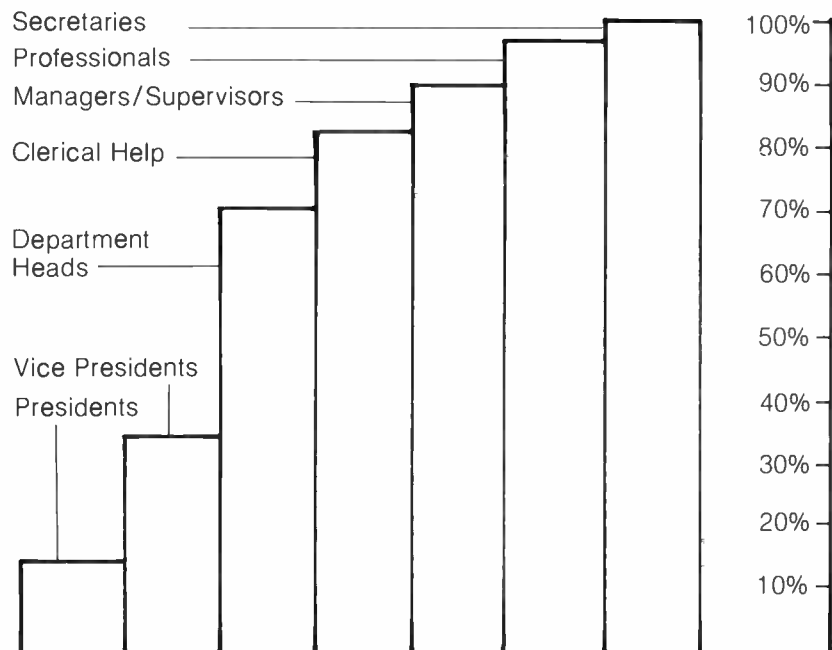
The limitations for the interconnectivity of LANs, intra-city or intra-region, stem from the "bottleneck" of low capacity of the Bell System plant. Cable systems,

Figure 3 Top Local Market Areas And Cable TV Penetration

Ranking By Installed Computer Base (\$)	SMSA Location	Percent of Homes Passed By Cable TV		General Purpose Computer Sites
		1981	1986	
1	New York City	28	42	2792
2	Chicago	6	38	2435
3	Los Angeles	23	46	1663
4	Washington	8	25	715
5	Philadelphia	23	61	1156
6	San Francisco	59	79	895
7	Detroit	4	6	912
8	Dallas	1	14	825
9	Boston	19	31	845
10	Houston	8	37	683

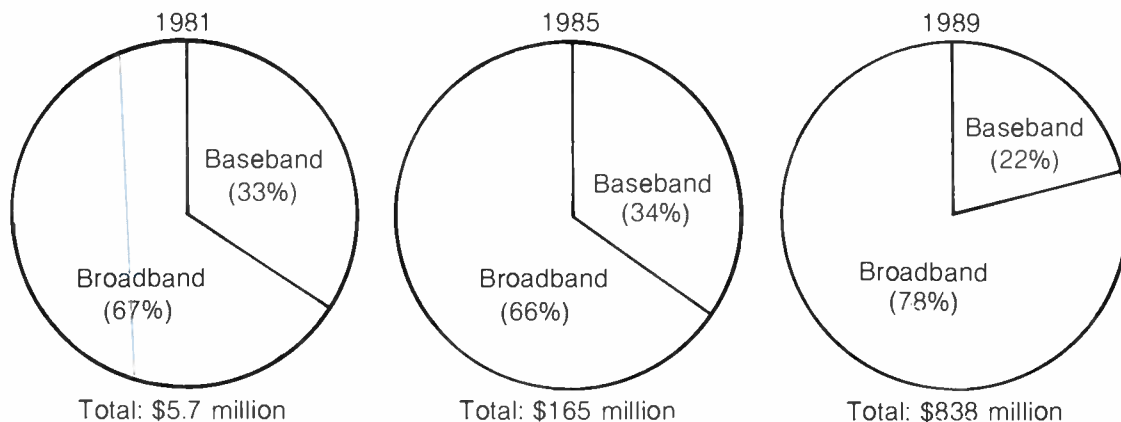
Source: The Yankee Group

Figure 4 The Anticipated Use Of Workstations



Source: International Data Corp. Survey

Figure 5 US Local Area Networks



Source: Frost & Sullivan

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using a full channel of 6 MHz bandwidth and any one of several multiplexing schemes for spectrum efficiency, offer the most sound engineering method for interconnectivity and gateway to long-haul common carriers. There is a natural marriage between LANs and cable systems and if the LAN is broadband, a high degree of synergism is possible.

Competition

Near-term competition for the market created by the Bell System's low capacity for data transmission will come from the Bell System itself. The system that is

currently the problem will try to be the solution as well. Known as Dataphone Digital Service (DDS), the Bell System provides specially treated copper wires that can transmit data at faster rates than voice-grade wire. However, for data rates exceeding 4,800 B/s, the monthly costs are prohibitive (\$411) and the installation delays (up to 6 months), unacceptable. The service does not reach all 92 targeted cities and the quality of service between the cities it does reach is variable. Moreover, in the aftermath of the AT&T divestiture, local service rates will continue to escalate.

A more formidable mid-term competitor

will be Digital Termination Service (DTS). DTS is a digital cellular microwave radio system operating in the 10.55 to 10.68 GHz range. None are in place, but thirteen companies have applied to the Federal Communications Commission for DTS channels. DTS promises to provide local digital data transmission at higher speeds, with a better bit-error rate and lower cost than the telco voice-grade lines.

But DTS is, at best, a partial solution. While DTS transmits data better than voice circuits, it cannot transmit voice. DTS may also be confronted with local zoning ordinances. DTS has line-of-sight problems as well, and if a business relies

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Bell On Hold

U.S. District Judge Harold Greene has withheld approval of the AT&T/Justice Department divestiture settlement until the two parties make proposed modifications in the accord. Among the changes sought by Greene is a seven-year ban on electronic publishing by Bell over its own transmission facilities—a proposal which has greatly pleased the cable industry.

In discussing the electronic publishing field, Greene said an unrestrained AT&T would have the ability to discriminate against competitors. According to Judge Greene, a seven-year ban would allow companies involved in electronic publishing to develop "sufficient strength."

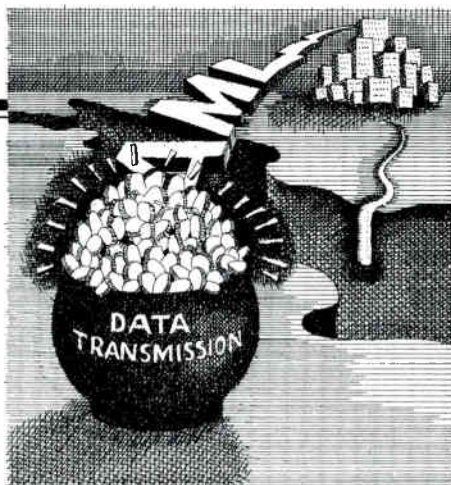
In his decision, Greene said, "There is a real danger that AT&T will use its control of the interexchange network to undermine competing publishing ventures." He said Bell could discriminate against competitors by giving trafficking priority to its own information operations, gaining proprietary information about its competitors, developing facilities favorable to its own services and hindering competitors through interconnections and tariffs.

Greene established a broad definition of electronic publishing, which is favored by the cable industry, and may be used in future legal briefs. It includes any information "originated, authored, compiled, collected or edited" by electronic means and is extended even to those with indirect financial interests.

If AT&T and the Justice Department do not agree to the terms set by the court, Greene threatened to reopen the trial. The settlement had been reached about three weeks before the trial would have finished, attorneys said. If the parties make the changes, Greene said he will "promptly approve" the settlement as being in the public interest.

—Craig Leddy

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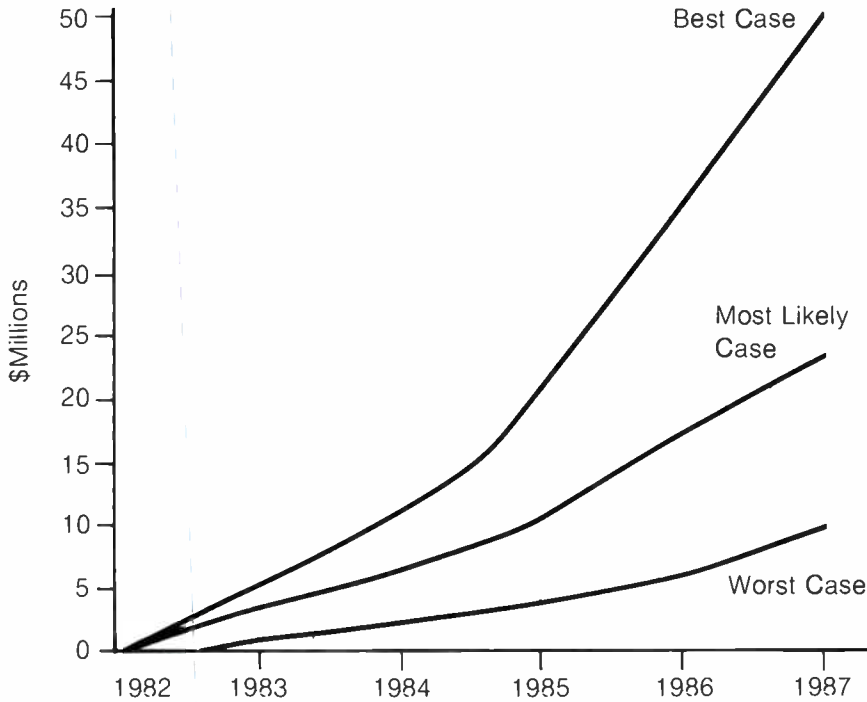
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Figure 6 DTS Growth



Source: The Yankee Group

on a DTS intra-city loop, chances are that new construction may eventually block transmission paths. But DTS may fill the need for high-speed data services until the major business markets are cabled. The sooner cable operators provide wideband local loop facilities for businesses, the more unlikely it will be that DTS will cut into and secure a hunk of the turf that CATV can dominate (see figure 6).

The Technology

Once the broadband cable system's two-way capability is activated, lower costs, lower bit-error rates and higher service availability are possible with the CATV facility, if the cabling of the business sites exist, because of higher bandwidth. Standard interfaces are used with data modems, statistical multiplexers, data link controllers, etc.

CATV modems become competitive at 1200 B/s and above and are much less expensive at 9600 B/s. Several modems are available for specific use with broadband CATV systems and are identified in figure 7.

A multitude of applications are possible to provide special services to the business community. But, in addition to high-speed data transmission, video conferencing appears to be the application of most immediate interest to business sub-

How to tell the Turkeys

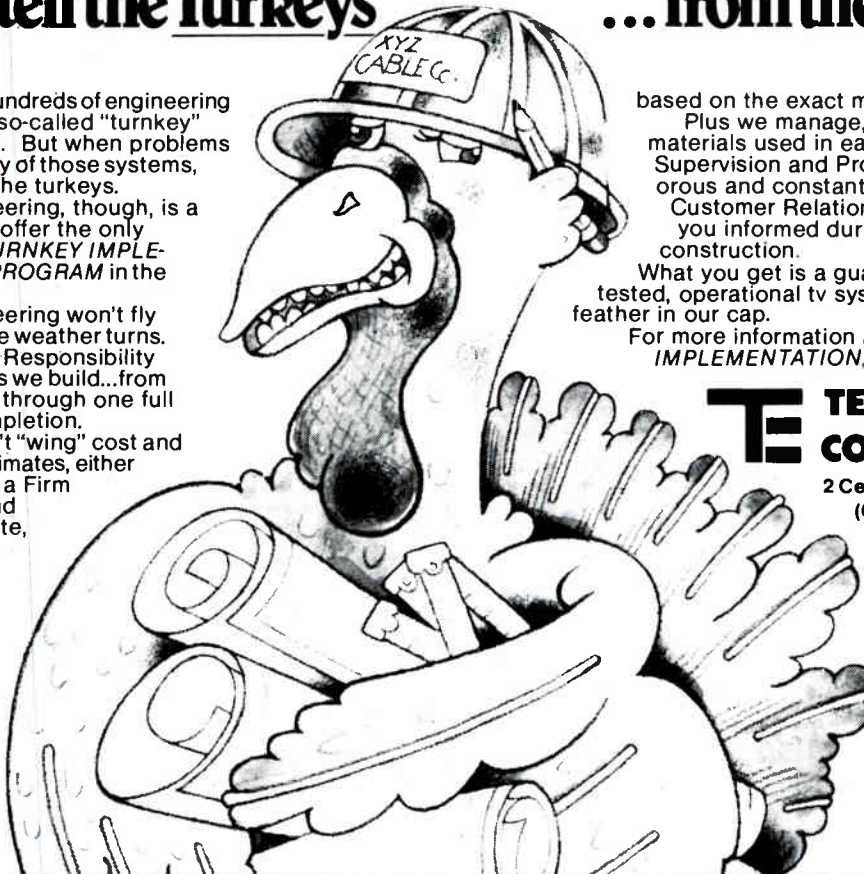
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scribers (see figure 8).

Widespread use of videoconferencing either intra-facility, intra-city or inter-city will require increasing bandwidth (see figure 9). The completion of the coaxial cabling of the major urban markets will ensure CATV's role in business data transmission.

The Demonstration

Last October, Local Digital Distribution Co., an M/A-COM-Aetna company, successfully operated an experimental program between San Francisco and New York involving Satellite Business Systems, Tymnet, Manhattan Cable Television, Viacom Cable Vision and LDD with several other participants (see figure 10). The demonstration proved the feasibility of existing technology for wideband local distribution of digital business communications, economically and efficiently, without the use of telco-system facilities.

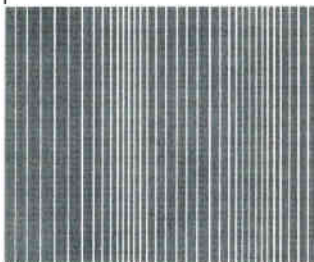
The demonstration brought together satellite communications, cellular digital radio, cable TV with packet switching, advanced user equipment and digital techniques. The transmissions used a single 1.5 MB/s full-duplex data channel in the SBS-1 satellite and SBS earth stations in New York and San Francisco. In San Francisco, the links then passed through a Tymnet central node and, via 10 GHz cellular radio or cable, to user offices. In New York, the links were from

Cable systems, using a full channel of 6 MHz bandwidth and any one of several multiplexing schemes for spectrum efficiency, offer the most sound engineering method for inter-connectivity and gateway to long haul common carriers.

the earth station to the cable system and then to users (see figure 11).

A feature of the demonstration was the verification of LDD's radio packet communications system (RAPAC) technology in the 10 GHz band, and cable packer communications system (CAPAC) technology for distribution beyond central switching nodes. RAPAC and CAPAC technologies were developed by Digital Communications Corp., a subsidiary of M/A-COM. The system operated at data

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rates ranging from 9.6 KB/s to 1.5 MB/s.

In the demonstration, about 50 percent of the users lacked line-of-sight paths to the cellular radio central node. In such cases, only cable could serve those users. There was no voice equipment tested. The bit-error rate performance exceeded 1×10^{-8} end-to-end and often reached 1×10^{-11} .

For the cable systems involved in the demonstration, it proved for the first time that a cable TV company can provide full satellite data communications for local

The completion of coaxial cabling of the major urban markets will ensure CATV's role in business data transmission.

distribution. The CAPAC technology uses existing CATV channels and includes RF modems and digital controllers. It is compatible with RAPAC technology. All central node equipment was shared by the two systems.

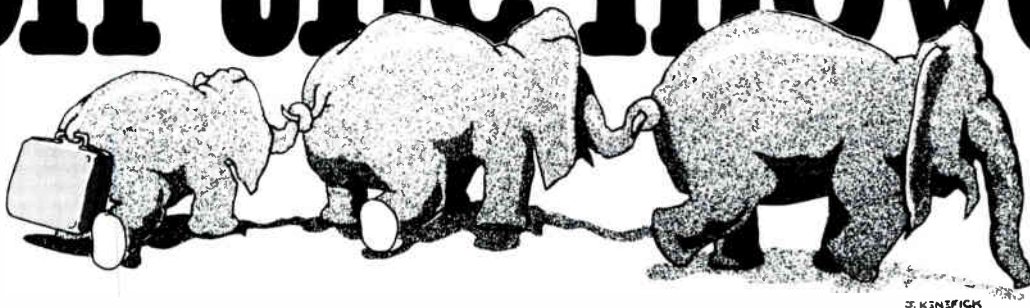
Conclusions

Business data information systems will

Figure 7 CATV Data Modems

Model	Speed (B/s)	Bandwidth	Price
AMDAX			
740	19,200	96 kHz	\$995
741	9,600	96 kHz	\$925
746	19,200	96 kHz	\$950
CableBus			
UAM-1	9,600	250 kHz	\$250
USM-1	19,200	250 kHz	\$450
E-COM TRM-202	9,600	96 kHz	\$750
ISI/3M 920	10,000	80 kHz	\$840
Prentice/CATEL	28,800	200 kHz	\$2,320
Scientific-Atlanta			
6402	1,544,000	750 kHz	\$350
6410	19,200	96 kHz	\$895

on the move?



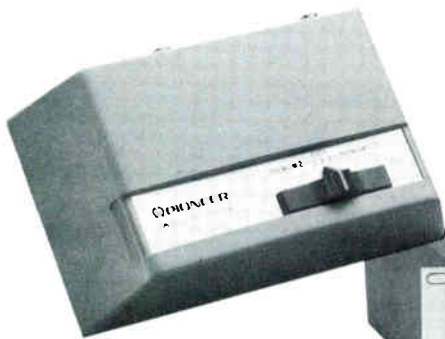
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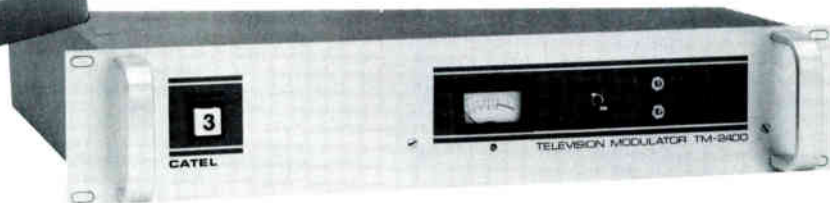
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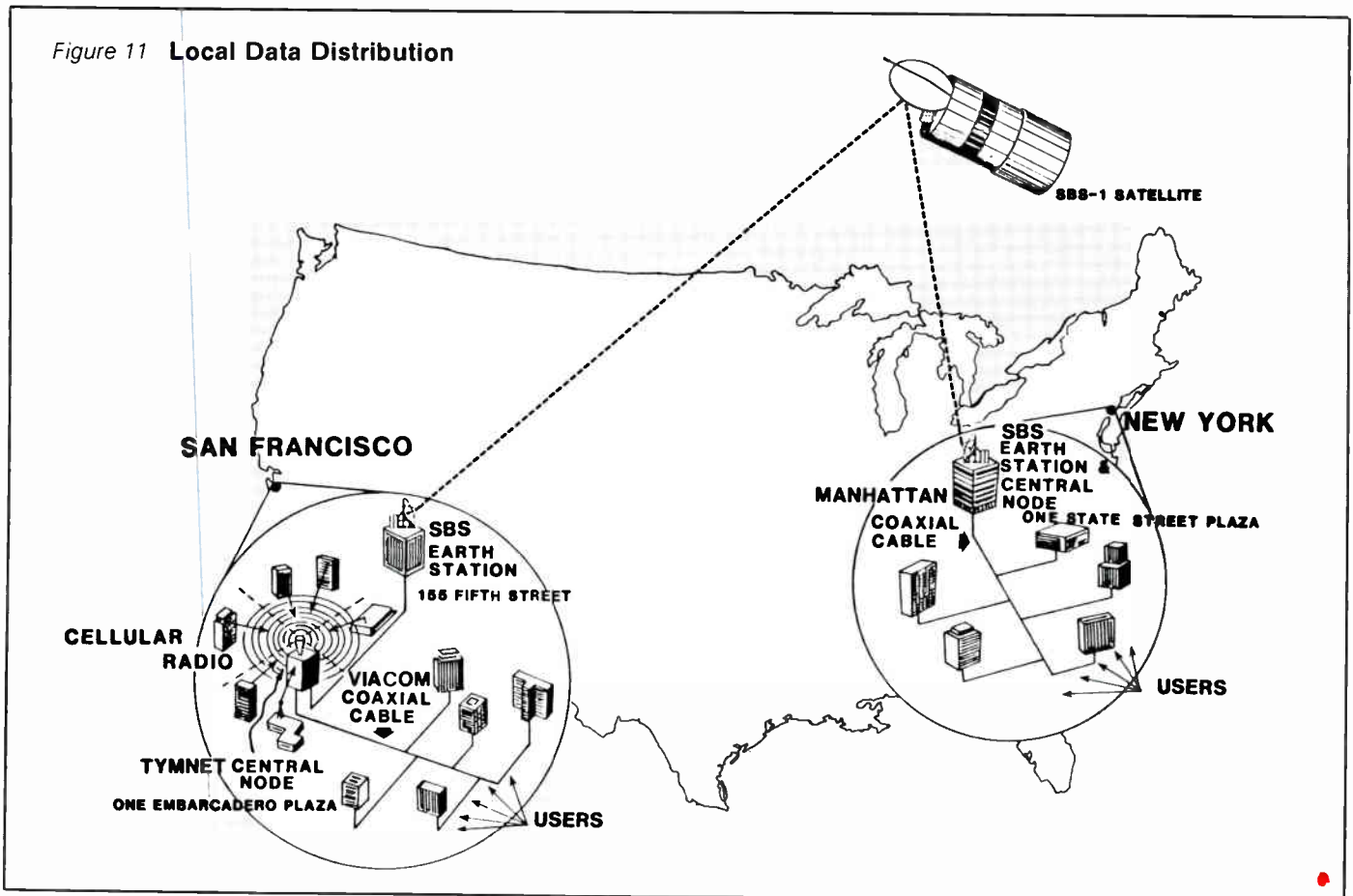
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Figure 11 Local Data Distribution



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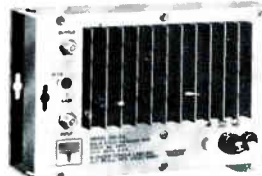


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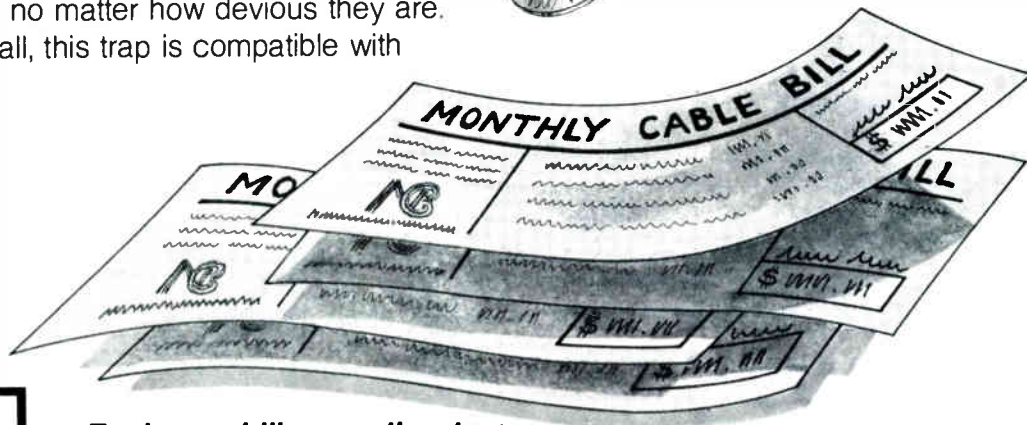
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High-Speed PCM Data Transmission On CATV Systems

Data transmission technology provides cable system operators with the opportunity to participate in one of the fastest growing and most important services available to both business and residential consumers. In this article the established multiplexing hierarchy for high-speed Pulse Code Modulation (PCM) data is reviewed, and practical applications on CATV systems are illustrated. Additionally, performance results for PCM data streams on coax links are given.

By Gilles Vrignaud, product manager, CATEL

The rapid proliferation of data transmission, worldwide, has created two major types of data networks. Satellite high speed data networks (e.g. SBS) that have ultra high speed transmission capabilities can span literally thousands of miles. Local high speed data networks (e.g. Hyperbus, Ethernet, etc.) are confined within

a plant or building. These networks are typically baseband time division multiplex systems, using highly sophisticated software to control protocol.

These two types of networks have comparable transmission speeds, and often need to be linked together. In many cases, they may be linked by telephone lines with limited capacities, a costly process which reduces the overall transmission efficiency.

Microwave transmission can be an alternative where channels and paths are available, but in most cases, an existing CATV plant provides a unique opportunity for the transmission of high speed data between the satellite entry point and the end user.

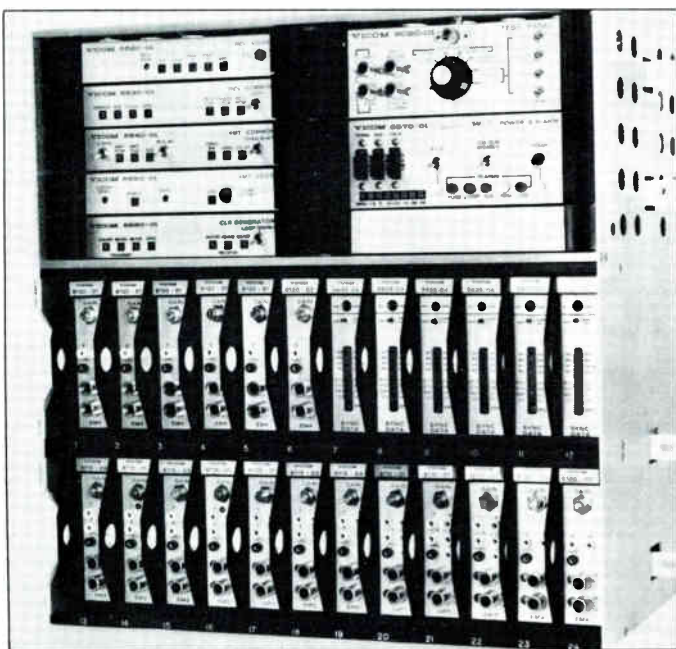


Figure 1 Typical data/voice to T1 rate multiplexer.

PCM Transmission Standards

In the telecommunications industry, PCM coding is commonly used as a method of handling audio and data signals. The most

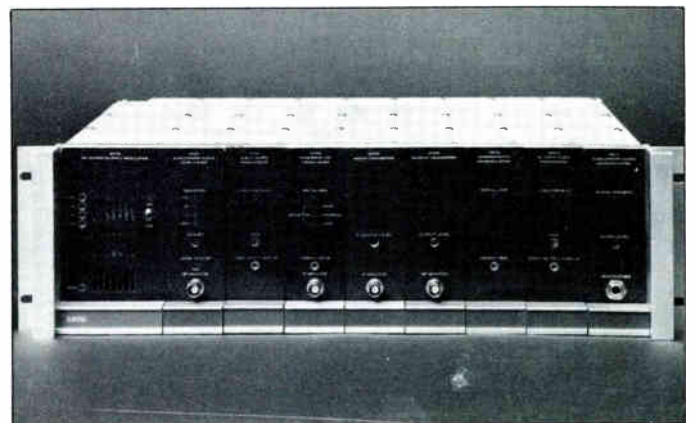
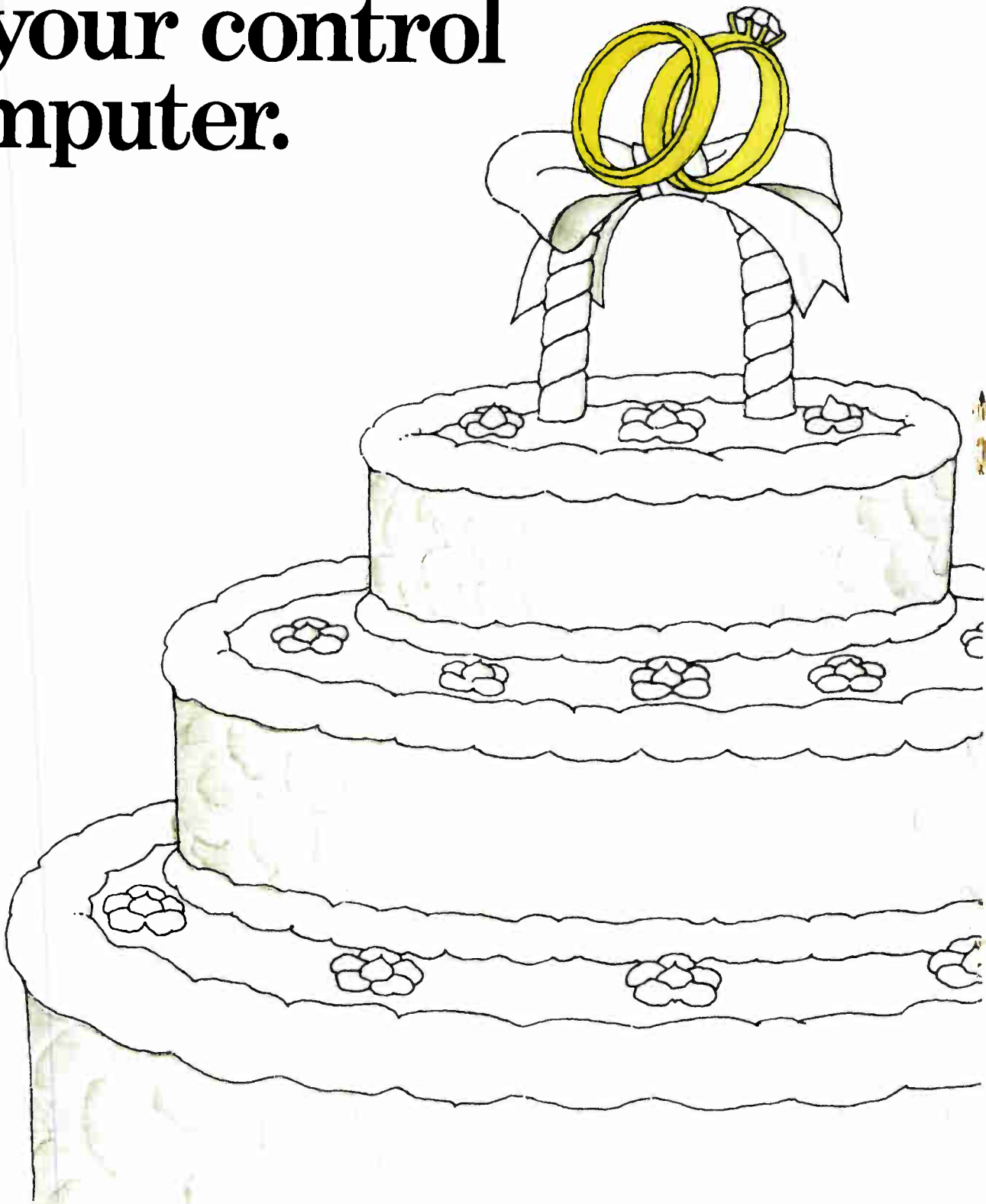


Figure 2 Typical broadband FM modem

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Every time you make a service level change or add a subscriber, you're probably using one system to start or change service and another to handle the billing. That duplication doubles your costs, and all too often results in delays, inaccuracies and lost information.

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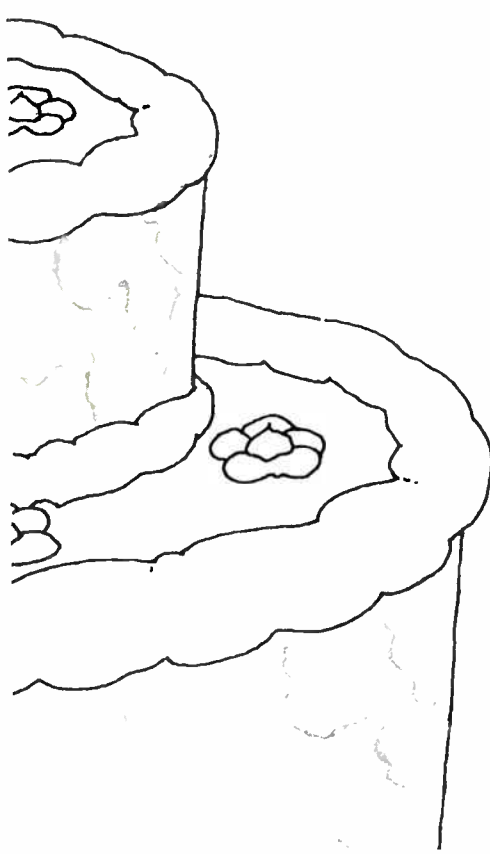
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commonly used format is known as a T1 carrier, created when 300 to 3400 Hz bandwidth voice channels are digitized with an 8-bit code at an 8 kHz sampling rate, and 24 such channels are time division multiplexed into a single serial bit stream. This data stream is known as a T1 carrier, and represents a data rate of 1.544 MB/s. When defined in terms of interface characteristics the T1 carrier becomes known as a DS-1 signal.

Further multiplexing produces the following hierarchy.

24 voice channels = one DS-1 channel (1.544 MB/s, T1 rate)

96 voice channels, or 4 DS-1 signals = one DS-2 signal (6.3 MB/s, T2 rate)

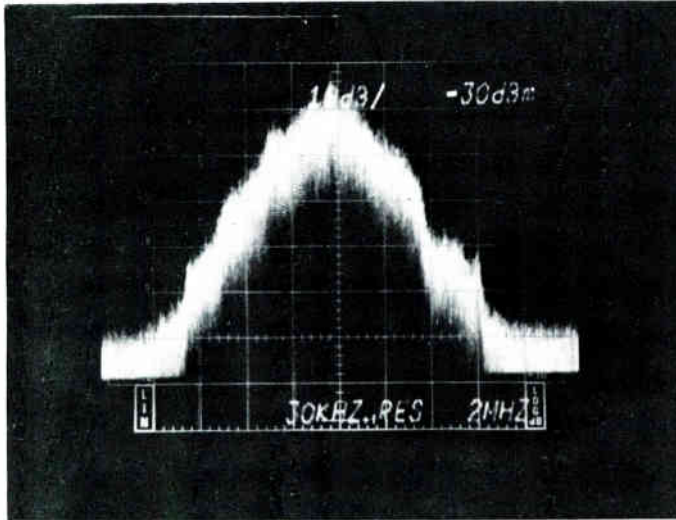


Figure 3 4-port multiplexer, FM modulated spectrum (96 voice/data channels, 6.3 MB/s)

672 voice channels, or 7 DS-2 signals = one DS-3 signal (44.736 MB/s, T3 rate)

Uses Of PCM Coding

PCM coding is not limited to voice channels. The most obvious spinoff from voice channel coding is the inclusion of serial data streams. In the basic T1 carrier format, any one voice channel represents a 64 kB/s data stream, and can therefore be replaced by pure data at a rate of up to 64 kB/s. In practical applications, rates up to 56 kB/s are used in place of one voice channel.

Several manufacturers offer multiplex equipment (see figure 1)

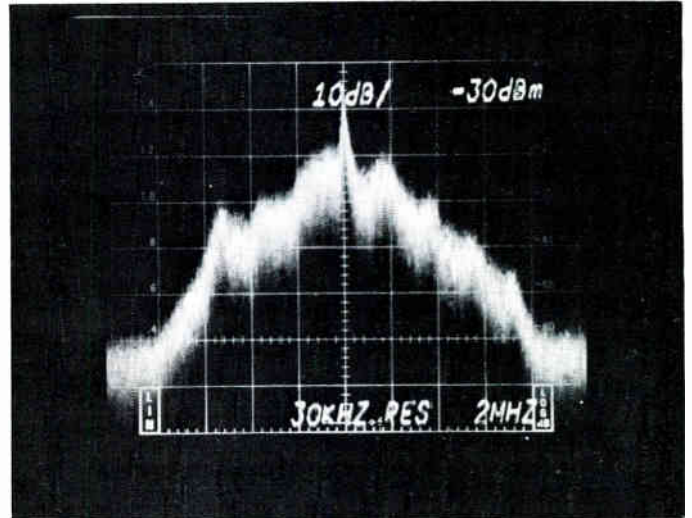
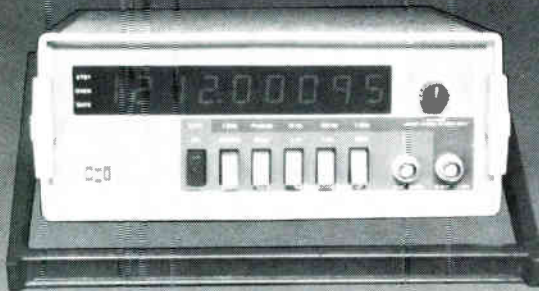



Figure 4 8-port multiplexer, FM modulated spectrum (192 voice/data channels, 12.6 MB/s)

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D510	\$179.95	50 Hz-1.0 GHz	0.1 PPM 20°-40°C PROPORTIONAL 10 MHz OVEN	9	15 to 50 MV	15 to 50 MV to 450 MHz	8-15 VDC 500 MA
D612	\$259.95	50 Hz-1.2 GHz			15 to 50 MV	20 to 100 MV to 1 GHz	
D1200	\$299.95	10 Hz-1.2 GHz			15 to 50 MV		

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to condense data signals, or mixed data and voice into the T1 format.

Digital coding of video signals has stimulated considerable interest, and current efforts are focusing on bandwidth compression techniques to carry broadcast quality video at T3 rate (44.7 MB/s). One manufacturer is currently offering teleconferencing quality (real time) video transmission at T2 rate (6.3 MB/s) and work is even being done on teleconferencing video at T1 rate.

Digital audio has become the choice format for master recordings, and is currently used on the PBS network as one method of very high quality transmission.

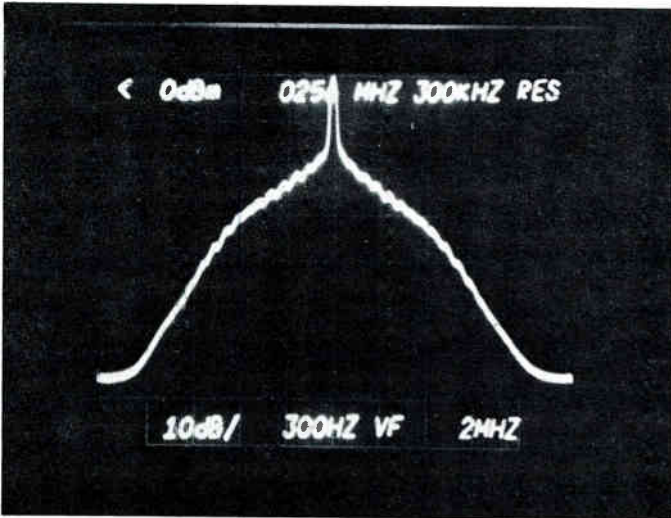


Figure 5 12-port multiplexer, FM modulated spectrum (288 voice/data channels, 19.2 MB/s)

Although there is no industry standard for stereo transmission on PCM data streams, a quick calculation will show that two premium quality audio channels could easily be multiplexed into a T1 carrier.

Data Stream Density And Bandwidth Requirements:

Manufacturers of PCM multiplexers offer various configurations, such as 2-port, 4-port, 8-port and 12-port multiplexers where each port handles one T1 line. All use multiple level (and/or phase) coding methods to reduce the occupied bandwidth of the PCM baseband signal.

Our work at Cotel has focused on the use of 4-, 8- and 12-port multiplexers in conjunction with broadband FM modems (see figure 2).

The coding efficiencies of the multiplexers are offset by the

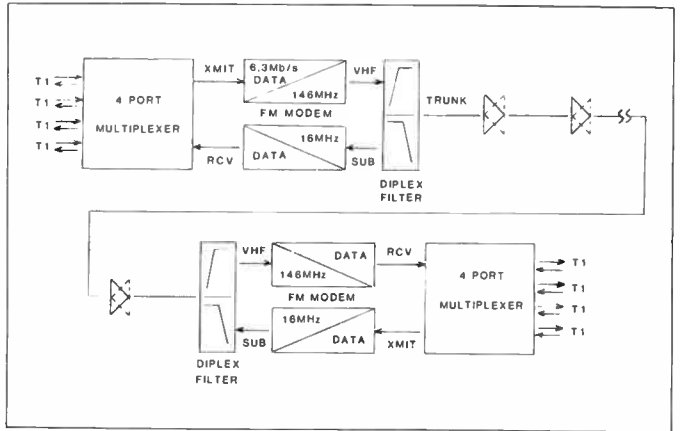


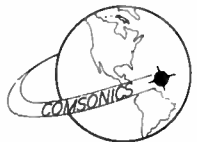
Figure 6 PCM multiplexer to CATV system interface.

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relative inefficiency of FM transmission. Past attempts at the use of VSB-AM transmission to reduce bandwidth have given disappointing results. The FM/PCM combination is a good compromise which allows highly reliable transmission with "off-the-shelf" components, while retaining an overall transmission efficiency which ranges from 0.5 to 1.2 bit/hertz (figures 3, 4 and 5).

Interfacing PCM And RF Equipment

PCM multiplexers are available with 75 Ohm BNC transmit/

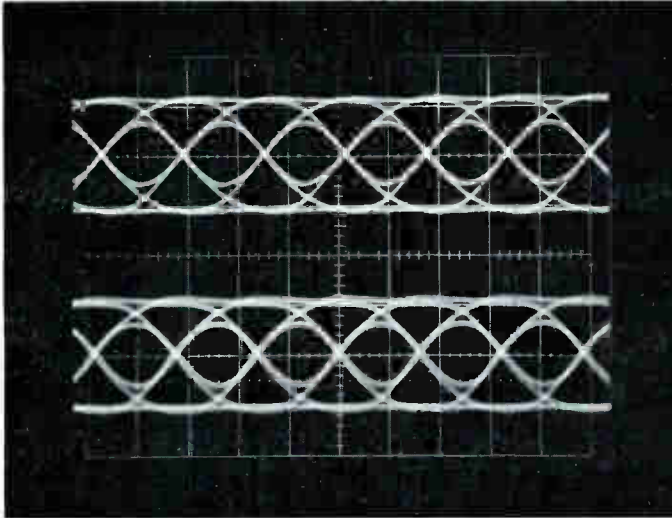


Figure 7 4-port multiplexer eye pattern (6.3 MB/s data)
Upper trace: transmitted
Lower trace: received

receive ports. The data amplitude at these ports is 1 Volt P.P., which makes interfacing quite straightforward. RF interfacing follows standard CATV procedures, and the complete interconnect is illustrated in figure 6.

Performance Results

The performance data presented here was obtained with an amplifier cascade of eight line extenders, equipped with duplex filters. Tracking input/output attenuators were used to create a variable carrier-to-noise ratio in the 25 to 35 dB range which is

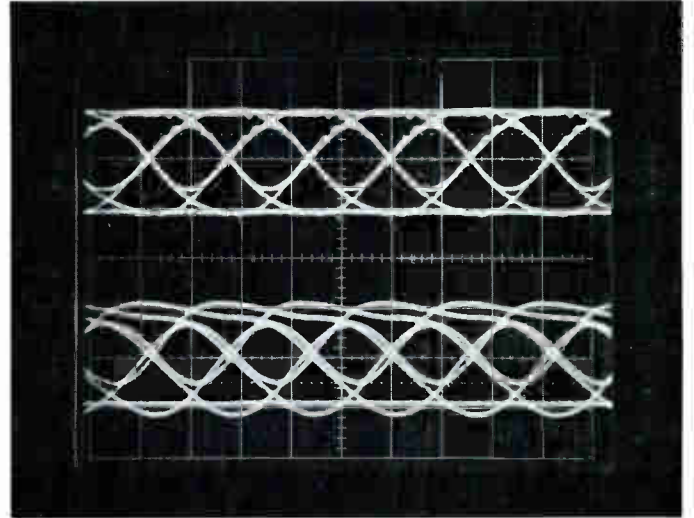


Figure 8 8-port multiplexer eye pattern (12.6 MB/s data)
Upper trace: transmitted
Lower trace: received

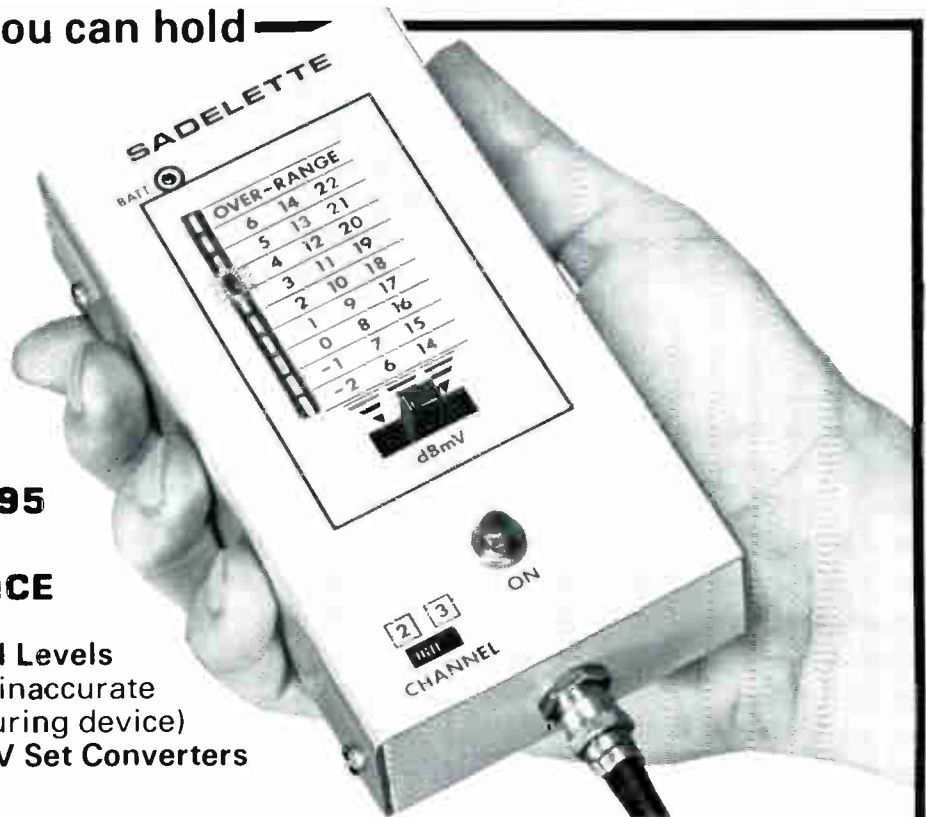
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considered to be a realistic range of "actual life" performance. Carrier-to-noise was measured on a Tektronix 7L13 spectrum analyzer following the manufacturer's recommended methods.

A qualitative evaluation of transmission performance was made by observing the eye pattern of data, which is created when all possible combinations of ones and zeros of the data are displayed on an oscilloscope locked to transmit clock. Results for 4-, 8- and 12-port data streams are presented in figures 7, 8 and 9 respectively.

A quantitative evaluation was made by performing a bit error rate test. In figure 10, bit error rate was plotted as a function of carrier-to-noise ratio for a 4-port multiplexer.

The effect of intermod products was simulated by sweeping an interfering tone through the modulated PCM data spectrum. The level of the interfering carrier was varied to produce a fixed error

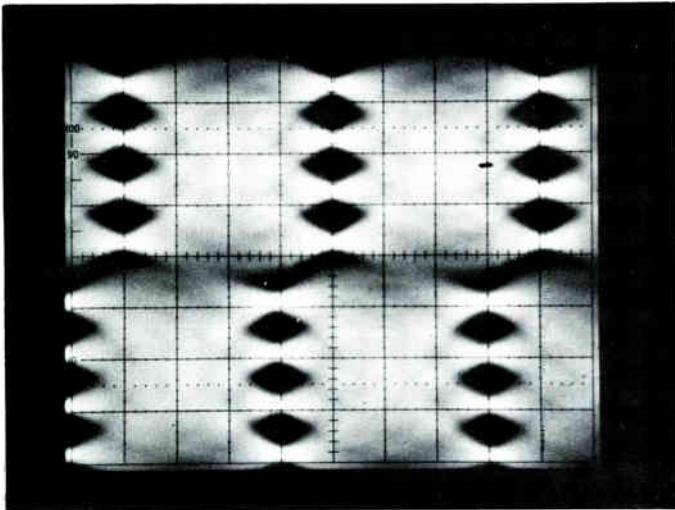


Figure 9 12-port multiplexer eye pattern (19.7 MB/s)
Upper trace: transmitted
Lower trace: received

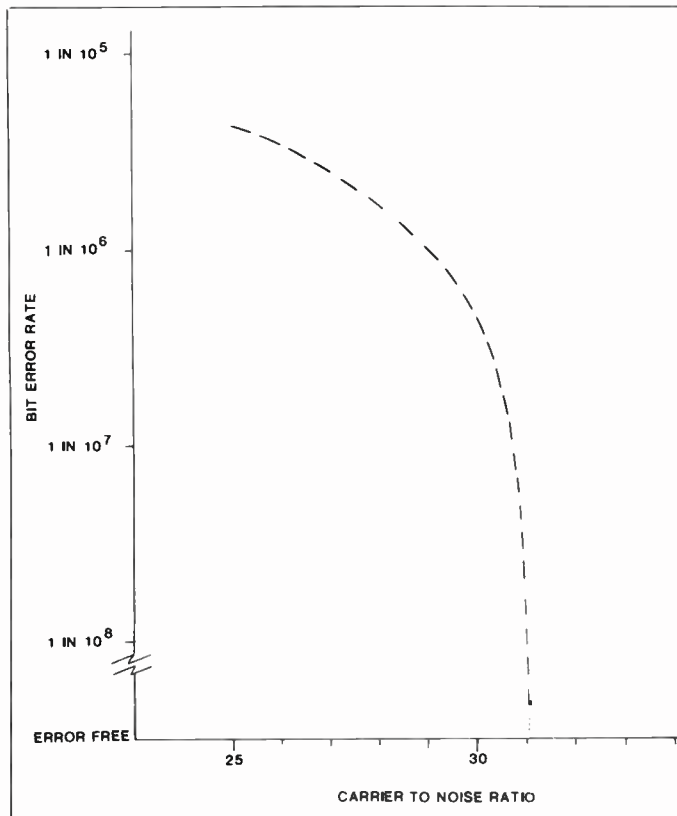


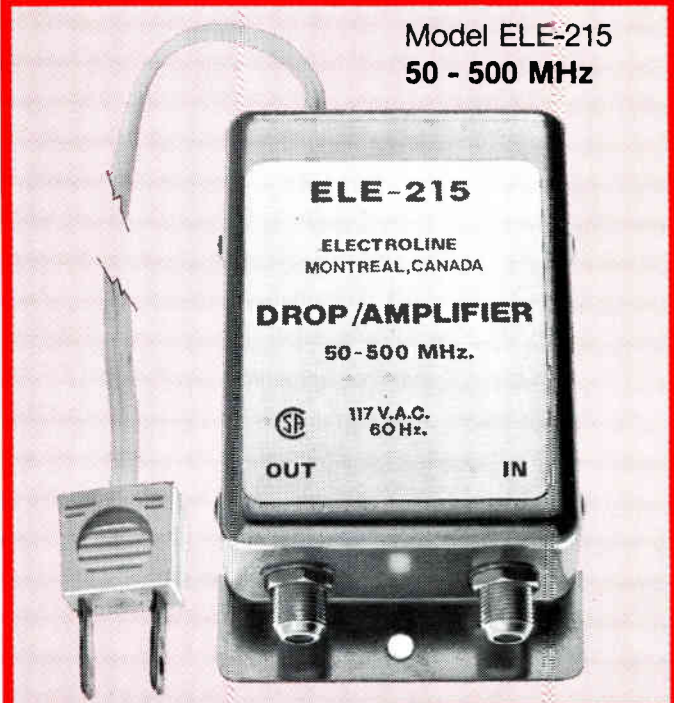
Figure 10 Bit error rate versus carrier-to-noise ratio

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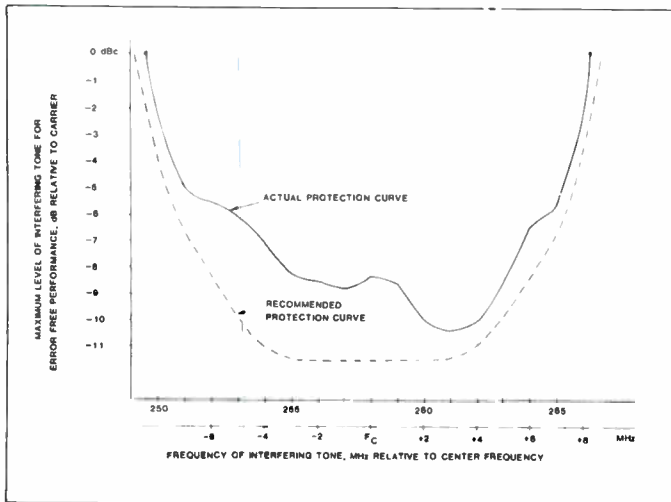


Figure 11 Protection curve for error free PCM operation in the presence of interfering tones

rate of 1 in 10^6 bits, considered to be the minimum acceptable for quality PCM transmission. Figure 11 illustrates the experimental curve derived, as well as a practical protection curve.

Conclusion

The T1 PCM carrier and associated multiplexers offer a versatile and accepted format for data, voice and even video transmission.

Interfacing T carriers to CATV systems is a straightforward procedure, and the performance results are excellent.

The inherent bandwidth capabilities of a coax network give the

CATV operator a unique opportunity to transport T carrier signals and participate in the current communication explosion.

General References

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Gilles Vrignaud, a native of France, is a graduate of the North Sydney Technical College in Australia. In addition to his training and technical work in Australia, Gilles held video and R.F. engineering positions in Canada for nine years. For the past four years, he has served as product manager for CATEL.

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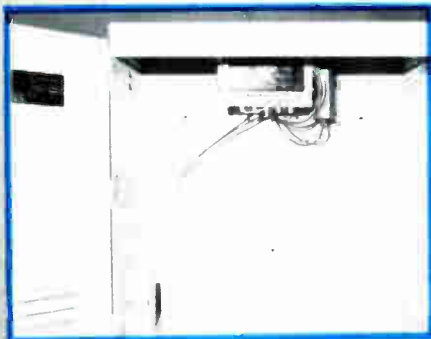
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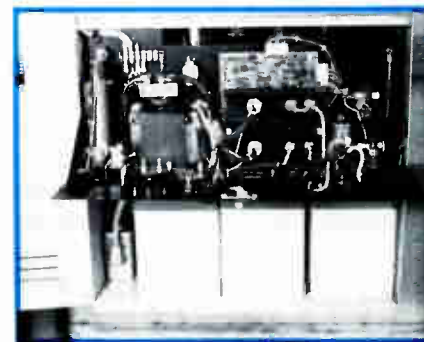
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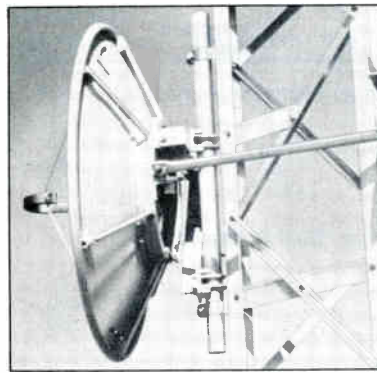
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Product Profile

CARS Band Antennas

The Community Antenna Relay Service (CARS) band is a congested frequency (12.2-13.2 GHz) used primarily by the cable television industry for terrestrial microwave links. The antennas described on the following pages may be used in a variety of applications. As always, we suggest that you contact the manufacturer for more specific information. Antennas for Communications Inc., Ocala, Fla., also manufactures antennas in the CARS band.



Model	Diameter-Ft. (meters)	Gain dBi (midband)	Beamwidth (degrees)	Front-to-Back Ratio	Maximum VSWR	Features	
Andrew Corporation, Orland Park, Illinois							
12.2-13.25 GHz—Single Polarized, Standard							
P4-122D	4 (1.2)	41.5	1.4	49	1.10	High performance antennas include shields for improved radiation performance. Those antennas are used where frequency plans and system coordination require a high degree of back and side radiation suppression. Low VSWR feeds minimize antenna system noise contribution. Standard antennas are economical and reliable; for use where frequency planning or coordination within or between systems does not require a high degree of back or side radiation suppression. LD and LDX antennas are designed for use in local distribution systems. Input flanges mate with WR75 choke and cover. Standard antennas are pressurable to 10 lbs. PSI. LD and LDX series are pressurable to 3 lbs. PSI. Antennas are center-fed. Standard antennas have continuous polarization orientation. LD and LDX series have horizontal or vertical polarization. Cross polarization discrimination of 25 dB minimum for dual polarized antenna permits optimum frequency coordination and compatibility digital transmission applications.	
P6-122D	6 (1.8)	45.1	0.9	53	1.08		
P8-122D	8 (2.4)	47.6	0.7	55	1.08		
P10-122E	10 (3.0)	48.8	0.6	57	1.08		
P12-122E	12 (3.7)	50.9	0.5	58	1.08		
12.7-13.25 GHz—Dual Polarized, Standard							
PX4-127C	4 (1.2)	41	1.4	52	1.10		
PX6-127C	6 (1.8)	45.1	0.9	52	1.10		
PX8-127C	8 (2.4)	47.6	0.7	54	1.10		
PX10-127C	10 (3.0)	48.8	0.6	57	1.10		
PX12-127C	12 (3.7)	50.9	0.5	58	1.10		
12.2-13.25 GHz—High Performance, Single Polarized							
HP6-122D	6 (1.8)	45.1	0.9	70	1.08		
HP8-122D	8 (2.4)	47.6	0.7	70	1.08		
HP10-122D	10 (3.0)	48.8	0.6	71	1.08		
HP12-122E	12 (3.7)	50.9	0.5	71	1.08		
12.7-13.25 GHz—High Performance, Dual Polarized							
HPX6-127D	6 (1.8)	45.1	0.9	68	1.10		
HPX8-127C	8 (2.4)	47.6	0.7	70	1.10		
HPX10-127C	10 (3.0)	48.8	0.6	71	1.10		
HPX12-127C	12 (3.7)	50.9	0.5	72	1.10		
LD Series							
12.2-13.25 GHz—Single Polarized							
LD2-122B	2(0.69)	35.5	2.8	42	1.12		
LD4-122B	4 (1.2)	41.4	1.4	49	1.10		
LD6-122B	6 (1.8)	45.1	0.9	52	1.10		
12.2-13.25 GHz—Dual Polarized							
LDX4-122B	4 (1.2)	40.8	1.4	48	1.15		
12.7-13.25 GHz—Super High Performance							
SHX10A	10 (3.0)	48.9	0.7	90	1.02		

Anixter-Mark, Des Plaines, Illinois

12.7-13.25 GHz—Plane Polarized, Standard

P-13048W	4	41.5	1.35	48	1.10
P-13072W	6	45.1	0.90	52	1.08
P-13096W	8	47.6	0.68	54	1.08
P-13012OW	10	48.8	0.60	57	1.08

12.7-13.25 GHz Dual Polarized, Standard

P-13048WD	4	40.9	1.45	48	1.10
P-13072WD	6	45.0	0.90	52	1.10
P-13096WD	8	47.5	0.68	54	1.10
P-13012OWD	10	48.7	0.60	57	1.10

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For House Drop Coaxial Cables specify:

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DE-3329	Stainless Steel Custom Dead-End for RG-59/U Coaxial Cable
DE-2525	Galvanized Dead-End for .051 Galv. messenger of Figure 8 RG-59/U Coaxial Cable
DE-2505	Galvanized Dead-End for .063- .072 Galv. messenger of Figure 8 RG-59/U Coaxial Cable

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PREFORMED LINE PRODUCTS

WangNet: A Local Area Network Designed With CATV In Mind

WangNet is a hybrid office network which includes data, video, audio and facsimile. WangNet was designed to meet the growing demand in all forms of data transmission. The design can be configured to be a complete local area, multivendor, computer communications network—down to a point-to-point application. Wang Laboratories Inc., as a manufacturer of computers and data transmission equipment, is dedicated to the efficient utilization of information through broadband/coaxial cable.

Information takes many forms—video, data, audio and facsimile. In the modern business environment the many different types of equipment used in handling information should be connected to share resources—WangNet is one such connection. WangNet

connect printers and remote workstations to host computers. Each band accommodates different data speeds, protocols and line utilizations providing an extremely flexible network.

Studies of office information flow, conducted by Wang, have concluded that

“U”, which is terminated at the ends, with all amplifiers aligned in the same direction.

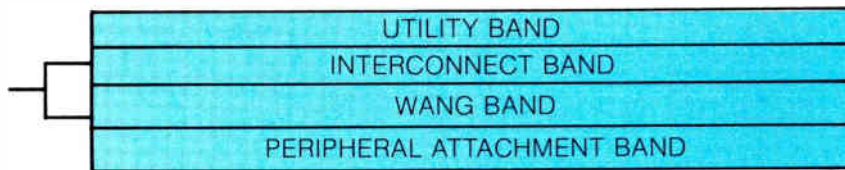
Utility Band

The utility band has a 42 MHz slice of the spectrum broken up in seven TV channels, corresponding to VHF TV channels 7 through 13. This spectrum is for non-Wang RF devices such as closed circuit TV, teleconferencing, video security, training or any devices which can use CATV spectrum.

Interconnect Band

The interconnect band has three subdivisions. Two groupings are comparable to telephone leased lines and the third is for switched channels. All interconnect band channels are protocol independent and support virtually any manufacturer's equipment. The switched band has 256 channels which are available at speeds of up to 9600 bps by using Wang frequency agile (FAM) modems. This switched capability provides point-to-point or

Wangnet's Multiple Services



can be characterized as a private cable system for office use. WangNet is designed in a tree configuration, like many cable systems, and can be the size of a room, a high-rise or a campus, and gatewayed to a cable TV system for metro transmissions to other WangNets or to individual information users. WangNet is a broadband, frequency multiplexed network as opposed to baseband, which restricts only one user to a cable.

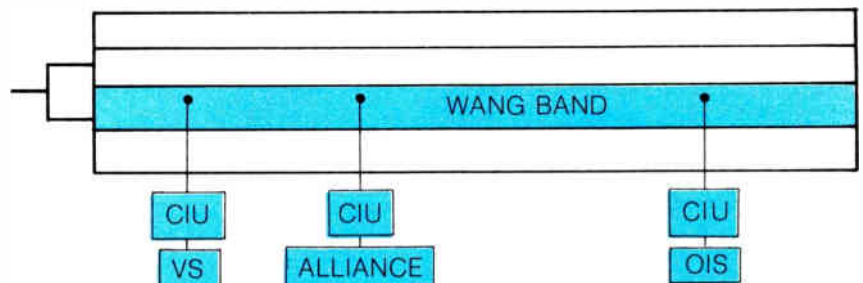
According to the U.S. Department of Commerce figures, by 1985 data transmission will represent about \$22.5 billion in domestic telephone company revenues, which is an increase of 642 percent over those of 1979.

Wang Band

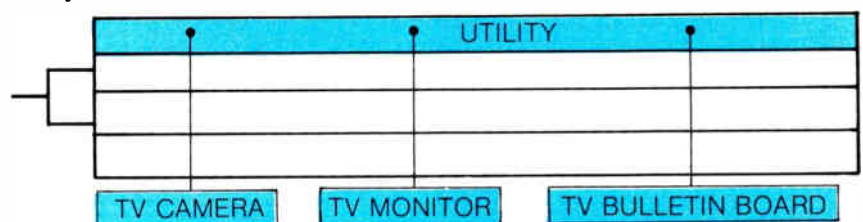
WangNet is designed to help accommodate this enormous data requirement by utilizing standard reliable cable TV components with a spectrum allocation of 340 MHz, divided into four major groupings. The utility band is for video and is transparent for many RF users—the Wang Band is for the interconnection of Wang computers and word processors. The interconnect band is utilized for the connection of equipment of many different manufacturers such as IBM and Digital. Finally, the peripheral band is used to

a dual cable system offers the most efficient design to handle present and future office needs, with one cable dedicated for upstream traffic, the other downstream. This dual cable design is actually a one-cable design looped back over itself or, in other words, an elongated

Wang Band



Utility Band



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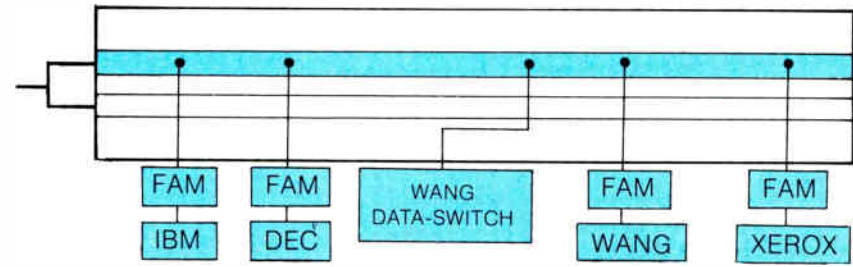
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Interconnect Band SWITCHED SERVICE



multipoint information transfer. Each frequency agile modem is controlled by a Wang data switch which selects available frequencies and addresses by continually polling all FAMs to keep track of their status and the availability of each channel. The two dedicated interconnect sub-bands include 64 channel allocations at speeds of up to 9600 bps and 16 channels for speeds up to 64,000 bps. Both dedicated channel groups require Wang fixed frequency modems (FFMs) to be used between compatible pieces of equipment.

The Wang Band is composed of a 12 megabit channel for the use of Wang Word Processing and Data Processing equipment. The Wang Band uses CSMA/CD contention protocol and a variable length HDLC packet protocol. Network connection is accomplished through a Wang cable interface unit (CIU) which is a general network processor that also has extensive diagnostic and network administration capabilities. Wang Band facilitates data base file and document transfers and electronic mail as well as many shared resource functions. Up to 16,384 devices can be connected to the Wang Band.

Peripheral Attachment Band

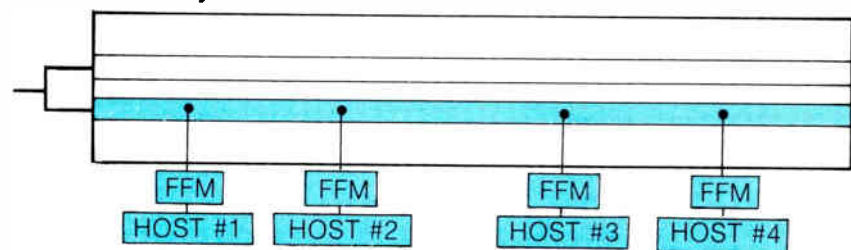
The peripheral attachment band is a means to attach thousands of work-

stations and printers to larger systems on the network in order to increase productivity through resource sharing.

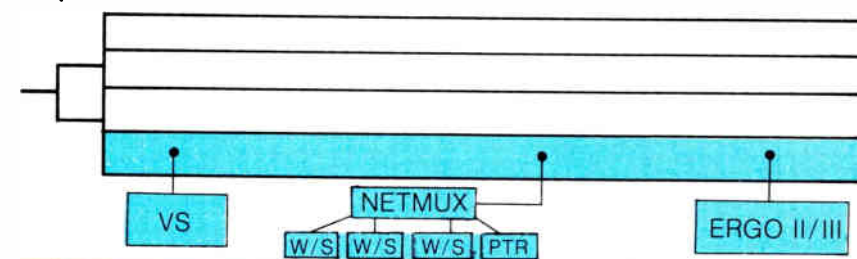
In its announced form, WangNet addresses the need for simultaneous flow of highly diverse information forms within a facility. However, recent studies indicate that while up to 80 percent of the information generated stays within this facility, this still leaves 20 percent destined for branch and regional offices. As a result, capabilities to be announced in the future include high speed "gateway" services between facilities, perhaps using in-plant CATV cable for these purposes. We believe that the choice we made several years ago of broadband technology for local networking will allow us the flexibility of using this technology to meet the communication challenges of the eighties, for both local and remote communication networking.

Jay Jubert has been with Wang Laboratories for one year and holds the title of marketing manager of networking. His previous experience included three years with Warner Amex Cable Communications, holding several positions including manager of marketing and development. Jubert obtained an MS degree in telecommunications from the University of Colorado.

Interconnect System DEDICATED SERVICE



Peripheral Attachment Band



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Eastern Show Technical Booth Guide

The Southern Cable Television Association expects this year's Eastern Show to be the largest ever with upwards of 4,000 industry workers and watchers in attendance. To help you make your way through the maze of exhibitors **CED** presents, on the following pages, a booth guide to the hardware and service-oriented exhibitors. We have also included a list of technical sessions that will be presented at the show. Topics covered range from addressable converters to cable security systems, fiber optics, and an FCC/FAA update. Speakers include Alex Best and David Slim from Scientific-Atlanta, Al Cushner, director of fiber optics at Times Fiber, Victor Tarbuton from Century III and Fred Reed with GTE Sylvania. As we did at the NCTA, **CED** will once again be publishing a special technical issue for the show. **CED Reports** is the only show publication providing you with the latest in product information. **Reports** will also feature interviews with industry leaders as well as late breaking news and technical developments. A complete booth guide to the Eastern Show can be found in the Sept. 6 issue of **CableVision** magazine.

Eastern Show Technical Sessions

Thursday, September 9

8:30-9:30AM — **Data Technology Coordination**

Speaker: Alex Best, principal engineer, Scientific-Atlanta

9:30-10:15AM — **Addressable Converters**

Speaker: Mike Hayashi, sales engineer, Pioneer Communications

10:45-11:15AM — **Business Data Communications**

Speaker: David Slim, senior systems engineer, Scientific-Atlanta

2:00-3:00PM — **Cable Security Systems**

Speaker: Carl Wieldman, manager, product marketing, TOCOM

Friday, September 10

8:30-9:15AM — **Status Monitoring**

Speaker: Daniel O'Connor, Texscan

9:15-10:00AM — **Fiber Optics**

Speaker: Al Cushner, vice president & director of fiber optics, Times Fiber

10:30-11:15AM — **Automatic Testing**

Speaker: Larry Harrington, product marketing manager, Tektronix

11:15-Noon — **Feed Forward Amplifiers**

Speaker: Victor F. Tarbuton, director of engineering, Century III

Saturday, September 11

8:30-9:15AM — **FCC/FAA Update**

Speaker: Roy Ehman, staff engineer, Storer Cable Communications

9:15-10:15AM — **Broadband RF Systems—450 MHz**

Speaker: Fred Reed, engineering specialist, GTE Sylvania

Technical sessions for the Eastern Show were organized by Harold Null, vice president of engineering, Storer Cable Communications, for the Southern Cable Television Association.

Booth Guide

Allied CATV Construction

Booth 419

Allied Steel & Tractor Products Inc.

Booth 1208

Alpha Technologies

Booth 854

AM Cable TV Industries Inc.

Booth 601

American Technology Company

Booth 1210

Anixter-Communications

Booth 554-556

Associated Plastics Inc.

Booth 2218-2220

Automation Techniques

Booth 421-423

Available Plastics Inc.

Booth 1037

Avantek

Booth 319

BEi

Booth 119

Belden Corporation

Booth 219-221-223

Bentley & Schultz Cable Const.

Booth 752

Boston Cable Company

Booth 733-735, 632-634

Brad Cable Electronics Inc.

Booth 111

CableBus Systems Corporation

Booth 608

Cable & Computer Technology, Inc.
Booth 239

CABLEDATA
Booth 2233

Cable Installation Services Inc.
Booth 756

Cable Security Systems Inc.
Booth 2136

Cable-Text Instruments Inc.
Booth 703

Cable T.V. Supply Company
Booth 101-103

Carbis ladders
Booth 129

Catel/TOMCO
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C-COR Electronics Inc.
Booth 142, 243

CCS Cable
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Century III Electronics International Inc.
Booth 809

Channel Commercial Corporation
Booth 2019

CHYRON
Booth 1248

M/A-COM Comm/Scope
Booth 633

Communications Supply Inc.
Booth 1243

Comtech Antenna Corp.
Booth 2125

CWY Electronics
Booth 116

Ditch Witch
Booth 501-503, 400-402

Dixie Pow-R Mole Co.
Booth 2030-2032

The Drop Shop Ltd.
Booth 1236-1238

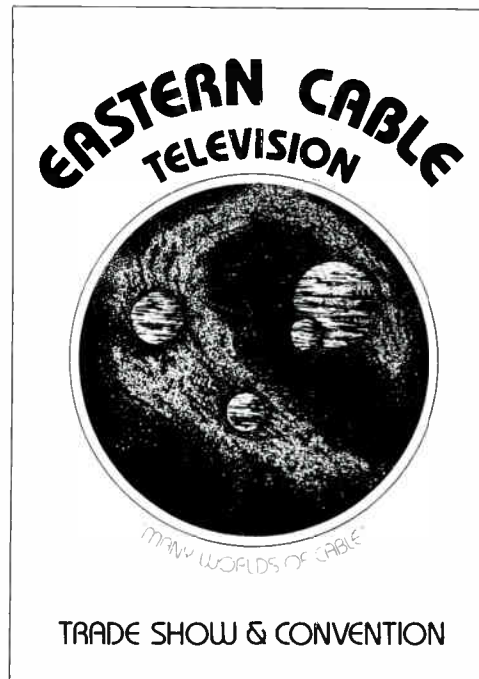
Durnell Engineering Inc.
Booth 2047

Eagle Comtronics
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Eastern Microwave
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Elephant Industries Inc.
Booth 1023

Ellis Tower Co. Inc.
Booth 932, 1033



Fortel Incorporated
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Fort Worth Tower Co.
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Hughes Aircraft Microwave Communications Products
Booth 618-620

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Jackson Enterprises
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Jerrold/General Instrument
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Kennedy Cable Construction Inc.
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Klungness Electronics Supply
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KMP Computer Services Inc.
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Leaming Industries
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Lemco Tool Corporation
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Linear Corporation
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Augat CATV Group c/o LRC Elec.
Booth 1261

Lundy Technical Center
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Magnavox CATV Systems Inc.
Booth 2001

Merril Cable Electronics
Booth 2101

Microdyne Corporation
Booth 350-352, 451-453

Moose Products Inc.
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Motorola Inc.
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Mycro-Tek
Booth 1143-1145, 1042-1044

Northern CATV Sales Inc.
Booth 401, 300

North Supply Company
Booth 614-616

Oak Communications Systems
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Octagon-Scientific Inc.
Booth 2028

PTS Corp.
Booth 859-861

Panduit Corp.
Booth 914

Phasecom Corporation
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Pico Products Inc.
Booth 709-711

Pioneer Communications of America Inc.
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Poleline Corp.
Booth 311, 214, 216, 315, 317

Power Vision
Booth 1206

Preformed Line Products Co.
Booth 1200

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Booth 2000

Pyramid Industries Inc.
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Quality RF Services
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Reliable Electric Utility Products
Booth 407-409

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Booth 737

RMS Electronics Inc.
Booth 200

Ripley Company Inc.
Booth 610

**Roart Div. of Cable Spinning
Equipment**
Booth 2037

SACHS CATV Division
Booth 1039

Satellite Syndicated Systems
Booth 211

Scientific-Atlanta Inc.
Booth 507

Standard Communications Corporation
Booth 855-857

Starview Systems
Booth 850-852, 951-953

Station Business Systems
Booth 1205(1/2)

Superior Electronics Center Inc.
Booth 1252

Supra Products Inc.
Booth 326

Tele-Wire Supply Corp.
Booth 304

Texscan Corporation
Booth 2041

3M
Booth 318, 320, 322, 324

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Booth 1101-1107

Time Manufacturing
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TOCOM Inc.
Booth 321

Toner Cable Equipment Inc.
Booth 842

Triple Crown Electronics Inc.
Booth 800

TVC Supply Co. Inc.
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Tyton Corporation
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US JVC Corp.
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Viewsonics, Inc.
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Universal Security Instruments
Booth 2034

Wavetek Indiana
Booth 234-236

Wegner Communications Inc.
Booth 745-747

Winegard Company, CATV Div.
Booth 551, 555, 454

Zenith Radio Corp.
Booth 758-760

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International News



Hughes Will Supply AUSSAT System

MELBOURNE, Australia—Australia will soon be operating three satellites to be supplied by Hughes Aircraft. Agreements have been finalized on a contract valued at close to \$175 million for the Ku-band AUSSAT space segment. The satellites, the first of which is scheduled for a mid-1985 launch, will be positioned at 156E, 160E and 164E longitude.

China Comm '82 Set For November

BEIJING, China—The People's Republic of China will host China Comm '82 November 3-11, the first telecommunications trade show ever to be held in China. Over 60 U.S. firms will travel to Beijing for the show which will feature exhibits covering telecommunications, electronics, computers, avionics and defense electronics. The Electronics Industries Association is co-sponsoring the show along with the China Council for the Promotion of International Trade. Only U.S. companies will be exhibiting. Some of the companies planning to attend are Western Union, RCA, Westinghouse, IBM, Digital Equipment Corp., GE, Honeywell, Wang Labs, Hewlett-Packard, Burroughs, Xerox, Control Data, Motorola, Radio Shack, Scientific-Atlanta, Rockwell and 3M.

Scientific-Atlanta To Acquire Digital Video Systems Inc. Of Toronto

ATLANTA—Scientific-Atlanta Inc. has announced that it has reached an agreement to acquire the assets and business of Digital Video Systems Inc. (DVS) of Toronto, Canada. DVS, a manufacturer of digital signal processing equipment for the television industry, has developed unique digital technology for scrambling and descrambling TV signals.

The agreement is subject to approval by Scientific-Atlanta's board of directors and by Canadian authorities which regulate foreign investment in Canadian firms. The agreement calls for the initial payment of 800,000 Scientific-Atlanta shares, with additional payments in stock based on the company's success. The additional payments may be made through 1985 and will permit the DVS owners to receive up to 1,600,000 additional Scientific-Atlanta shares.

Sidney Topol, chairman and president

of Scientific-Atlanta, characterized digital scrambling as the key technology for pay TV and direct broadcast by satellite. "The major U.S. programmers are planning to invest vast sums to pursue their opportunities," said Topol. "Programmers and satellite carriers, which seek to serve cable-TV, mini-cable systems for apartments and condominiums and ultimately individual homes, must have assurance of security of their broadcasts. The developments of DVS are based on state-of-the-art technology for encrypting and scrambling signals and for presenting high-quality descrambled pictures and sound to the viewers." Topol indicated that Scientific-Atlanta sees this as a large international market. "In addition to cable TV and direct satellite broadcast in the U.S. and Canada, European and other nations expanding their satellite television systems should be significant markets for this equipment," he stated.

Telesat Canada To Lease Six Satellite Channels

OTTAWA—Telesat Canada has received approval for its contract to provide Argo Communications Corp., a U.S. satellite carrier, with six channels on the Anik D satellite, scheduled for launch on August 12. This contract was signed by Telesat in accordance with an intergovernmental arrangement between Canadian and U.S. authorities concluded in 1972. The Telesat-Argo contract has also been given regulatory and governmental approval in the U.S., pursuant to the 1972 arrangement.

Anixter Acquires Canadian Cable TV Distribution Company

SKOKIE, Illinois—Anixter Canada Inc., has acquired Micro-Sat Communications, of Pickering, Ontario. Micro-Sat is a specialized distributor of products to the cable television industry in Canada. Micro-Sat will fully utilize all of Anixter's on-line, computer linked Canadian locations, as well as the entire U.S. and international network, as they expand their operations.

According to the company, the end result of the acquisition of Micro-Sat is to be the leading supplier to the cable television industry in Canada. Micro-Sat will remain in its present facilities, with current management and staff. It will distribute major product lines to the Canadian cable television industry.

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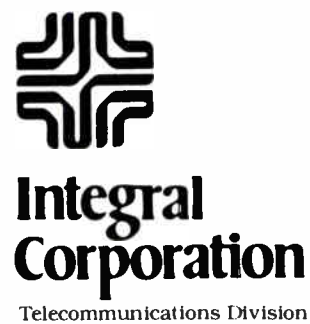
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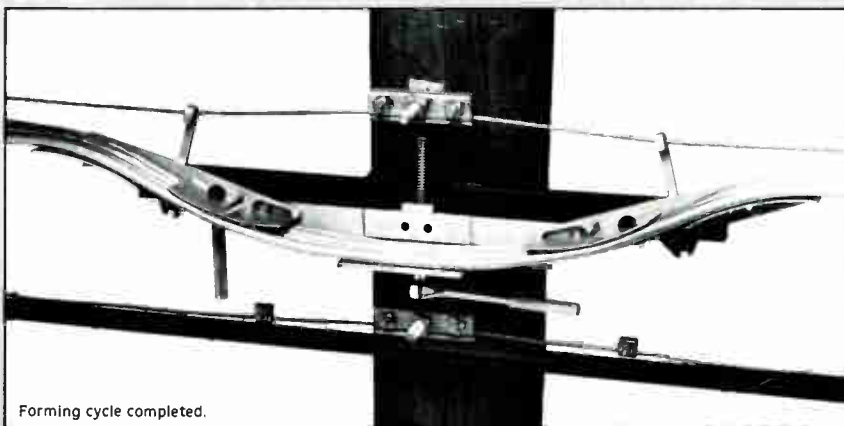
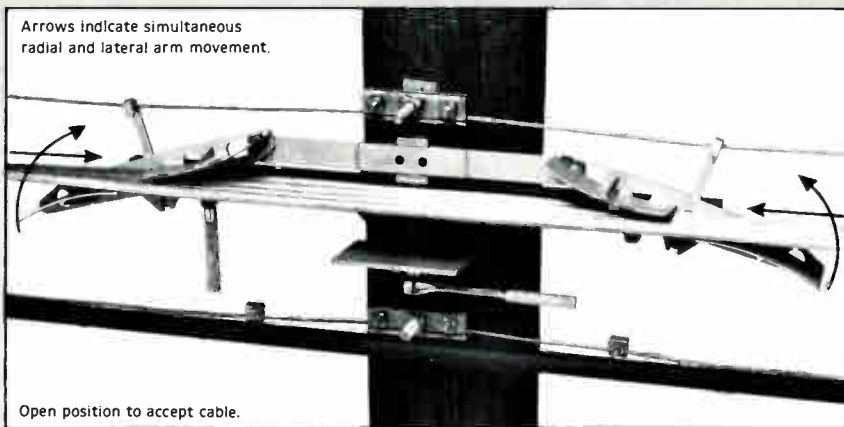
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Model No. G120

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★ **Lorri Kaufman** has been promoted to senior applications engineer for **Hughes Aircraft Company's** microwave communications products. Kaufman has been with Hughes since 1979. Since joining Hughes, she has been responsible for microwave path and system design for the company's line of AML microwave equipment used throughout the CATV industry. As senior applications engineer, Kaufman will take a more active role interfacing with CATV customers designing large microwave systems.

★ **Stephen Clarke** has been named vice president of operations for **American Cable Television**. Clarke was formerly ACT's vice president of finance and administration.



Guy Beakley

★ **Guy Beakley** has been named vice president-research and development at **Scientific-Atlanta**. Beakley joined Scientific-Atlanta in 1977 and has served in several technical and management positions. Since 1980 he has been director of research and development for the company.

An electrical engineering graduate of Vanderbilt University, Beakley completed his Ph. D. degree at Yale University in 1970. From 1969 until joining Scientific-Atlanta, he was with the RCA David Sarnoff Research Center in Princeton, N.J. At RCA he was responsible for programs in analog and digital television transmission systems. After joining Scientific-Atlanta, Beakley has led several of the company's product development projects in satellite communications.

★ **Mucip Inc.** has announced the promotions of **Richard deFriesse**, **Alfred Olsen**, and **Lloyd West** to the position of general manager for the N.Y.C., Detroit

and St. Louis metropolitan areas respectively.



Edwin Mitchell

★ **Edwin Mitchell** has been appointed to the newly created position of engineering manager at **Century III Electronics**. Mitchell will be responsible for engineering design and development.

Prior to joining Century III, Mitchell spent 11 years with Anaconda-Ericsson, most recently as production engineering manager with the responsibility of directing all test engineering activities. He was also a contract design engineer at various midwestern electronics companies and a design engineer at Collins Radio Company.

★ **Amplica Inc.** has announced the addition of **Burt Ashens** as sales manager for the Telecommunication Products Division. He will be responsible for Telecommunication Product sales throughout the United States.



Michael Chapman

★ The **Jerrold Division** of General Instrument Corporation has announced the appointment of **Michael Chapman** as

director of CAD/CAM operations. He will manage the application of computer-aided design (CAD) and computer-aided manufacturing (CAM) equipment for the company.

★ **Robert Tenten**, director of engineering at **Manhattan Cable TV**, received an award for excellence in earth station technology before the New York State Commission on Cable Television and the New York State Cable Television Association. Tenten assisted closely in the conception, design and development of Manhattan Cable TV's custom-built earth station utilizing twin spherical antennas.

★ **General Electric Cablevision Corp.** has announced the election of **Frank Baxter, Jr.** to vice president of engineering. Baxter holds a BSEE from Penn State University and joined GE in 1971. Prior to that he held various engineering positions with C-COR Electronics Inc. and HRB-Singer Inc., both of State College, Pa. He is a member of the IEEE, ARRL and SCTE.

★ **Jeffrey McQuinn** has been named general manager of **American Cablevision of Indianapolis**.

★ **Richard Wadman** has been appointed general manager of **Greater Boston Cable Corp.**, a subsidiary of Colony Communications Inc. Wadman was most recently regional operations manager for Colony Productions, Ltd., which provided Home Box Office via multipoint distribution service (MDS) in Boston, Springfield and Providence, R.I. to more than 20,000 customers.

★ **Robert Craven** has joined **Gill Management Services** as vice president of Data Services. Craven had been at Optimum Systems Inc., and its acquiring firm, On-Line Business Systems Inc., for thirteen years, most recently as vice president.

★ **C-COR Electronics Inc.** has been advised of the appointment of **Joseph Preschutti**, director of engineering, to serve on the National Cable Television Association Engineering Committee. Preschutti's appointment, effective immediately, was based on recognition of his ability and dedication to the industry. Preschutti joined C-COR in 1972 as a CATV engineer. He was promoted to chief engineer in 1977 and to director of engineering in 1979. He is responsible for directing all research and product development activities.

Classifieds

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RF DESIGN ENGINEER—Requires BSEE plus one year minimum experience, \$30-40,000.

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SALES MANAGER—Requires strong sales background will supervise 2-5 employees for sale and marketing security services. Mid \$20s plus commission for this Missouri locale.

GENERAL MANAGER—Strong marketing and management skills required for this upper Midwest system. Up to \$40,000.

CHIEF TECH—FCC required for this 8 employee system in New York, mid \$20s.

CHIEF TECH—Strong outside maintenance skills required for this excellent Nebraska system, \$24,000 plus vehicle.

DESIGNER—Requires knowledge of drafting and system design for this Southwestern location, \$10.00 per hour.

CHIEF TECH—Good outside maintenance skills required for this small Virginia system, \$18,000.

CHIEF TECH—Must be able to proof, with good outside skills for this excellent South Dakota locale, \$24,000.

LEAD TECH—2 plus years of outside experience required. Individual will be assisting Chief Tech in this beautiful Virginia location, \$19,000.

CHIEF TECH—Requires 3 plus years of solid outside supervisory experience for this Texas Gulf Coast location, low \$20s.

CHIEF TECH—Requires 35-channel experience for this excellent Midwest locale, \$24,000.

CHIEF TECH—Strong AML microwave experience required for this 200-mile West Coast system, \$25,000

CHIEF TECH—Design and build headend for hotels, position will have lots of travel. \$25,000 plus bonus.

BENCH TECH—Converter and amp repair in excellent Texas location. Salary is open.

RF TECH—Requires RF Design capability with Midwest locale, up to \$28,000.

LEAD TECH—Supervise 3 techs in this excellent Colorado location, \$19,000.

TURNKEY TECH—10 percent travel required installing dishes and headend in the Southwest, \$24,000.

SERVICE TECH—2 plus years of outside experience troubleshooting required, \$8.00 per hour.

MAINTENANCE TECH—Duties will involve trunk maintenance and customer service work for this California location, \$8.59 per hour.

HEADEND TECH—Requires heavy bench and headend experience for this California location, \$24,000.

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Excellent opportunity and growth for experienced Chief Technician. Minimum 5 years experience in all phases of system construction, including aerial, underground, apartment, pre/post wire, design, maintenance, trouble shooting common system faults and technical operations. FCC license preferred, but will consider offsetting experience. Must be capable of coordinating and training students in training program. Send resume and salary history to:

Satellite Communication Systems, Inc.
1308 W. 105th St.
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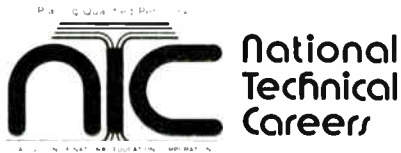
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CHIEF TECHNICIAN

Excellent opportunity for experienced technician to oversee a 50,000-plus, 800-mile, bi-directional system. Responsibilities include tower and antenna maintenance, FCC testing, new plant activation and technical training. Will supervise staff of 15 or more. Technical degree, 3-5 years experience as Chief Tech in a large system, and strong management ability required. Attractive salary and benefits. Vehicle provided. Send resume to:

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Personnel Manager
Coaxial Communications
3770 East Livingston Avenue
Columbus, OH 43227
(614) 236-1292

DIVISION ENGINEER

Satellite Communication Systems, Inc.

Is seeking a Division Engineer responsible for technical decisions in the Midwest. This person must have at least 5-10 years of extensive CATV experience in both microwave and cable distribution. A BSEE and an FCC First Class License is required, benefits and salary will be commensurate with experience. We are an equal opportunity employer. Kindly send your resume to: Satellite Communication Systems, Inc. 1308 W. 105th St. Chicago, Il. 60643

SENIOR DESIGN ENGINEER FEE PAID TO 40 K

A leading East Coast Cable TV components manufacturer is offering an unusual growth opportunity for a talented design engineer. The candidate must have an electrical engineering degree, as well as experience in the design of video scrambler/descrambler devices and related RF communications items. Although some traveling is required, the candidate would work at the East Coast corporate headquarters.

The company is listed on The American Stock Exchange and offers a generous benefits program. This includes Blue Cross, Major Medical and dental coverages, as well as an excellent noncontributory retirement pension program.

If you meet these qualifications and would like additional information about this fine career opportunity, please contact:

Mr. John de Elorza
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201-686-5511

Company will pay
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CHIEF TECH/INSTALLER TECH

2,000-subscriber system in rural portion of Central Florida needs Chief Tech who wants to grow to be Manager Tech. Also need Installer Tech. Both must have pleasing personalities, be team players and willing to do whatever is necessary to get the job done. Send resume to:

P.O. Box 6466
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TECHNICIANS LOOKING UP!

We're a small rapidly growing Midwestern MSO with systems in smaller communities throughout Iowa, Wisconsin and Illinois.

What do we offer?

Technical positions with rapid growth potential and good compensation packages. The technical challenge of being involved in all areas of cable television including microwave transmissions, headend and system maintenance. Growth into management.

What must you have?

A desire to move up and the ability to grow professionally. Two or more years of cable television experience in troubleshooting and system maintenance but more importantly, you must be characterized as a hard-working dedicated individual with a "can do" attitude. You must possess good leadership and communications skills.

If you have the potential we have the position. Interested? Send your salary history and resume to:

Combined Cable Corporation
33 West Higgins Road Suite 1000
South Barrington, IL 60010
Attn: John M. Hare

Field Engineering CONNECTICUT

TIMES FIBER COMMUNICATIONS, a major provider of CATV cable and fiber optic CATV electronic systems seeks to expand its systems and installation engineering staff:

PROJECT ENGINEER:

BS in Eng. Min 3 yrs CATV plant construction supervisory experience. Related communications systems experience considered. (National travel).

SENIOR FIELD TECHNICIANS: ASEE preferred. Experience in field installation of communication systems. (National travel).

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All positions based in our Connecticut headquarters. Qualified candidates (only) may call (800) 243-6904 and mention this ad. In Connecticut call 265-8407 or you may write to Mr. Douglas R. Fuchs, Employment Manager

TIMES FIBER COMMUNICATIONS

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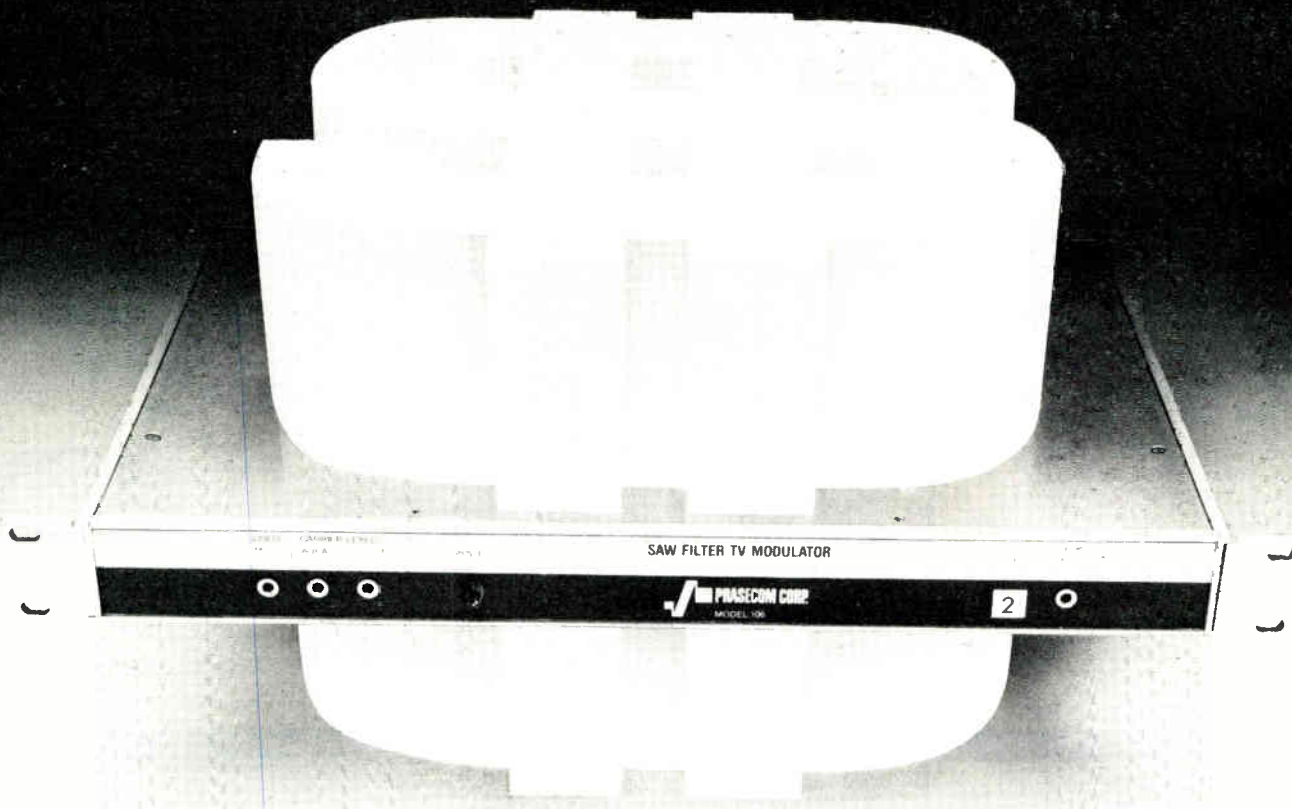
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M/F

DIRECTOR OF ENGINEERING

Satellite Communication Systems, Inc. is a rapidly-expanding diversified communications company. We are seeking an aggressive individual to direct the engineering activities of our Chicago Headquarters. The individual selected will be responsible for the specifications, acceptance, and quality control of satellite, cable television, communications, telecommunications, hardware, and equipment. Will monitor all technical consulting contracts and evaluate technical proposals and system construction. A degree in electrical engineering and a minimum of 8-10 years experience in satellite or microwave communications is highly desirable. Excellent salary and benefits program. Interested applicants please send detailed resume and salary history to:

Satellite Communication Systems, Inc.
 1308 W. 105th St.
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PRICE BREAKTHROUGH!

Phasecom's New Earth Station Modulator

High Performance/Low Cost

The Model 106 is a full specification modulator ideally suited to interface with satellite receivers. It also has a very modest price tag. With features like a SAW filter, output AGC, 60dB

down spurious at a full + 60 dBmV output; all in a quality package. No one can match it at \$895. So now, every time you add a new satellite service, you don't have to compromise with a low performance modulator.

Now in stock at leading distributors.

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Scientific-Atlanta Introduces Five New Products

Scientific-Atlanta has introduced five new products to the CATV industry, a security monitoring station and transponder, 2.8- and 3.2-meter earth stations and a compact television modulator. The security monitoring station and the transponder have been added to the series 2400 cable security monitoring system product line to give the cable operator flexibility in entering the CATV security business.

The model 2422 security monitoring station consists of a model 2420 microprocessor-based headend alarm scanner, a model 2412 display terminal and a software package. The model 2422 encompasses the major monitoring functions of a more expensive central monitoring computer system, except that subscriber data base information must be kept in a manual file.

The station can process up to 15 different alarm messages, including fire, intrusion, medical emergency, personal assault and tampering. When an alarm occurs the terminal displays the reporting transponder's digital address and the type of alarm in progress.

The terminal can hold up to 48 alarms in a queue, and allows the security operator to respond to the most urgent ones first. All information displayed can be printed out by an integral thermal printer.

Scientific-Atlanta has also introduced the model 2431 cable security transponder. The new transponder, which is compatible with most residential alarm systems on the market today, offers several options to increase the flexibility of the CATV security monitoring package.

The transponder is compact and has automatic reverse RF level adjustment for easy installation.

The model 2431 can be configured with a standby battery and a digital dialer for system redundancy. An expander module is also available. The expander module allows up to four remote alarm switch panels to be wired to the same transponder. This is particularly valuable for apartment-type housing where there are many subscribers in a small area. A built-in alarm switch plate on the transponder allows alarms to be registered manually by the resident.

The security monitoring station can be upgraded to a central monitoring computer system at any time with no cost penalty. The monitoring station can also be used as a backup to the central monitoring computer system, or as a communications monitor for troubleshooting with the more complex central monitoring computer system.

The series 9000 earth stations replace the current models 8006 3-meter and 8012 3.65-meter antennas and, according to the company, provide superior surface tolerance, a universal mount with a motorization option and simplified, reduced-cost installation. The side-lobe performances meets FCC proposed regulations for two degree satellite spacing at 4 GHz.

The feed system is available in single or dual-polarized configurations for C-band operation. Surface accuracy and mount stiffness of the elevation-over-azimuth mount ensure excellent performance at Ku-band when a 12 GHz feed assembly is used.

The 2.8-meter antenna can be expanded to 3.2-meters using easily installed



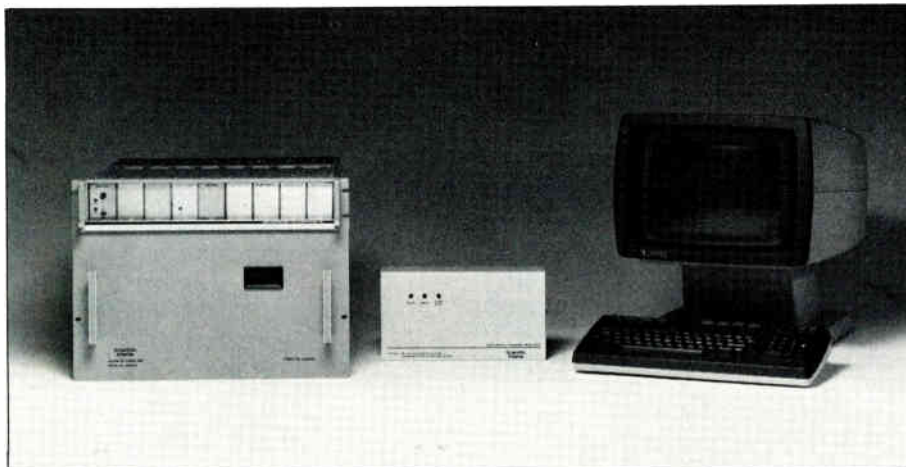
Scientific-Atlanta series 9000 2.8-meter earth station

extender panels. This low-cost option offers 1 dB additional gain. All panels are fabricated using a die stamping technique that produces an extremely high surface tolerance, resulting in higher efficiency and lower sidelobe levels.

The new 6330 video modulator provides excellent performance over twenty-one VHF and mid-band channels. This modulator offers solid state performance, yet, according to S-A, it is smaller and more cost effective than previous modulators. The 6330 is particularly valuable in CATV operations because of its economy and high performance, and its compact size makes it ideal for "mini-cable" and SMATV applications.

Four 6330 modulators can be mounted in a standard 19-inch headend chassis. The unit's dimensions are 5x4x12 1/4 inches (heightxwidthxdepth). Extensive use of integrated circuitry allows production of compact units. Important standard features include surface acoustical wave (SAW) filters, vestigial sideband response and adjacent channel capacity, and single IF loop-through for scrambling. Available options include dual IF loop-through and Spectrum Inversion (SI) for additional flexibility.

According to S-A, the 6330 provides excellent differential gain and differential phase response. It meets FCC predistortion requirements and offers excellent



Scientific-Atlanta model 2422 security monitoring station



Scientific-Atlanta 6330 modulator

group-delay characteristics. Front panel features include audio over-deviation and white clip indicators, video carrier output level control and a -20 dB test point.

For more information contact Scientific-Atlanta at (404) 441-4000.

Anixter Mark Introduces New Steerable Antenna

Anixter Mark has introduced a new 5-meter steerable antenna system.

The new design features a hydraulically actuated, single axis position control that will allow an operator to switch between satellite signals easily. Available with either TX/RX or TVRO capabilities, the Anixter antenna is suited for teleconferencing, broadcast and cable television systems, and for any satellite communication service that requires great flexibility.

The 5-meter steerable antenna system also features a zero-offset polar mount and a standard antenna repositioning rate of 1 degree per second. (Optional repositioning rates of 2 degrees or 0.5 degrees per second are available.) The antenna can cover the entire geostationary arc with no changes to mount members, and can be positioned within 0.05 degrees accuracy.

The standard control has seven programmable positions. One position can be used as a manual override, and additional programmable satellite positions are available.

The installation of this dish requires no



Anixter Mark 5-meter steerable antenna system

heavy equipment (normal installation time for three men is a maximum of eight hours). The steerable 5-meter dish is constructed of 24 precision stamped interchangeable aluminum petals.

For more information call Anixter Mark toll free at (800) 323-5273.

Antenna Technology Corporation Unveils New Product Line

Antenna Technology Corporation has announced development of Simulsat 7 and Simulsat 3.

Antenna Technology currently manufactures Simulsat 5, a multi-beam satellite antenna, which can view all domestic satellites simultaneously (83°W-136°W) with 44 dBi gain on each of 20 feed positions. According to the company, Simulsat currently dominates the multi-beam antenna market with roughly 90 percent of all multi-beam antenna installations in the United States.

The new Simulsat 7 will provide all of the flexibility of the Simulsat 5, with performance characteristics of a conventional 7-meter parabolic antenna.

The Simulsat 3 multi-beam antenna has been primarily designed for radio broadcasters. With performance characteristics of a conventional 12-foot parabolic antenna, Simulsat 3 will allow broadcasters to view all of our domestic satellites simultaneously for the ultimate in programming flexibility.

All Simulsats will have the capability of receiving C-Band and K-Band transmissions by utilizing a recently developed feed horn. Orders for the new Simulsat models are currently being taken for delivery in January 1983.

For more information about Simulsat, contact ATC at (602) 264-7275.

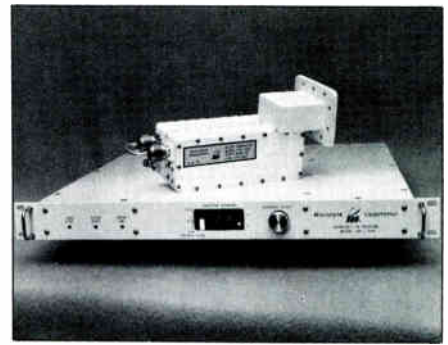


Comtech 1155 agile modulator

New Tuneable Modulator

Comtech Data Corporation has introduced their new CDM 1155 tuneable modulator. A thumbwheel channel-select switch permits tuning in any one of 55 channels rapidly. Use of a SAW filter and a phase-locked channel synthesizer locked to a 45.75 MHz crystal reference assures excellent stability and performance.

For more information, contact Comtech Data Corporation (602) 949-1155.



Microdyne 1100 DCR and 1100 BDC downconverter

New Downconverter System From Microdyne

Microdyne Corporation has unveiled its latest satellite receiver, the 1100 BDC/1100 DCR. According to the company, the 1100 R block converter receiver system is a cost-effective and highly flexible way to provide programming to subscribers and the system configuration helps overcome the distance constraints normally found when long cable runs are necessary.

The standard 1100 BDC converter incorporates a 110 degree K GaAs FET low noise amplifier to establish an optimum signal-to-noise ratio for the system. Frequencies and impedances have been selected so CATV-type cables and connectors can be used for maximum cost savings in the interconnection between the antenna, 1100 BDC and the receiver location.

The 1100 DCR downconverter receiver has a double conversion tuner designed for maximum image rejection, best possible noise figure and high temperature range stability. Polarization selection is accomplished by solid state technologies. Pricing for the 1100 BDC/1100 DCR system was not given.

For more information, contact Microdyne (904) 687-4633.

Cablewave Announces New FLC Low Loss Foam Cable

Cablewave Systems has announced the availability of their new FLC low-loss, low-density, 7/8" foam coaxial cable in a new design that exhibits lower attenuation than prior foam cables. The proprietary design features closed-cell foam dielectric with low-density and high-velocity specifications. FLC cable provides low-loss performance characteristics that are virtually as low as air dielectric cable but devoid of the pressurization requirements associated with air cable.

The outerconductor is annularly corrugated for flexibility, crush resistance and prevention of moisture migration. The Cablewave construction provides exceptional connector-to-cable attachment strength. Bonding the foam dielectric to the copper-clad aluminum center conductor and mechanically securing the outer

Set-top converters are obsolete.

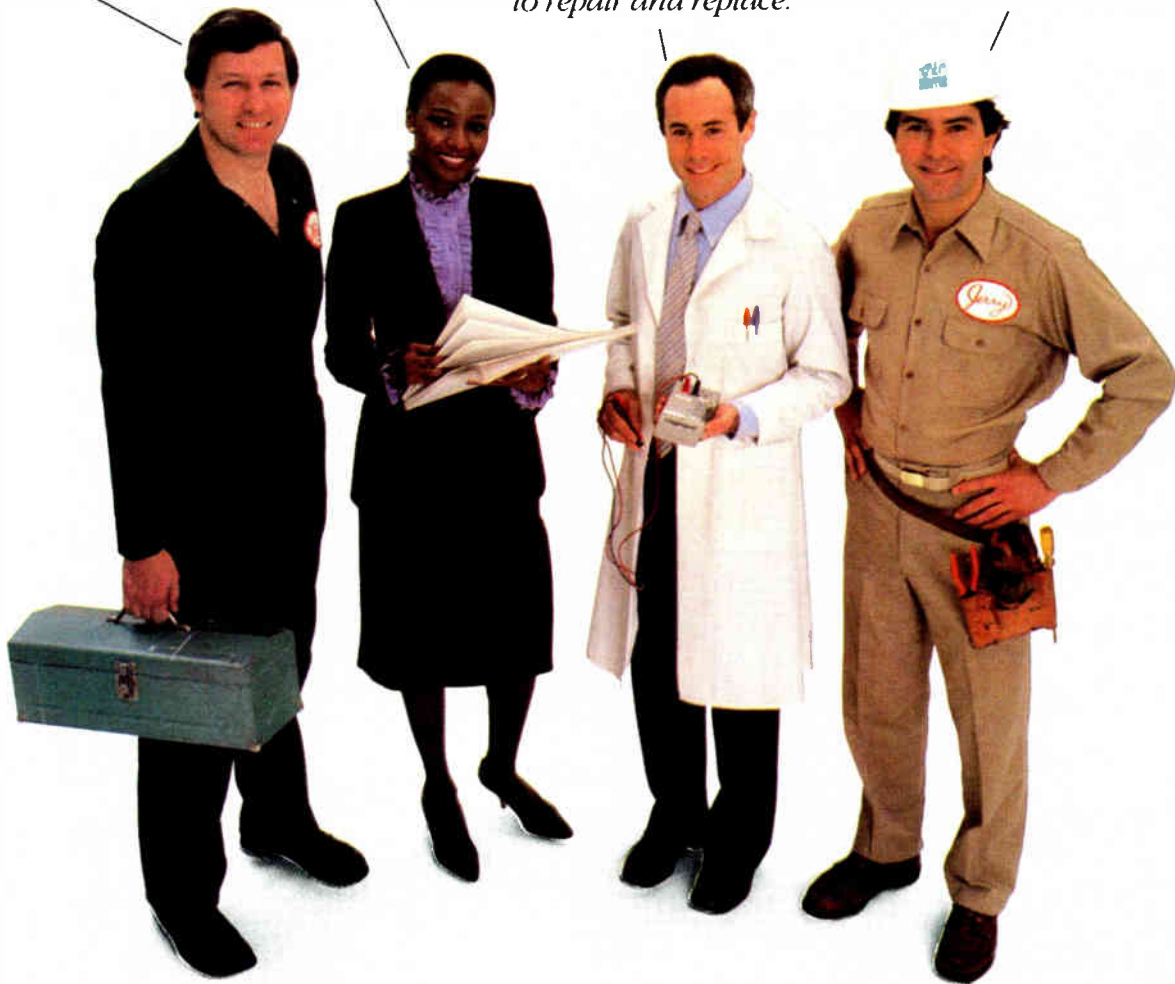
MINI-HUB SLASHES OPERATING EXPENSES.

*Fewer service calls,
reduced truck maintenance.*

*Instant disconnect or
reconnect from central
office.*

*No more set-top converters
to repair and replace.*

*No more lock outs, or
converters to pick-up.*



Only with the Mini-Hub™ System will you have total remote disconnect/reconnect, remote authorization/verification, and remote upgrading/downgrading capabilities. The subscriber program controller also provides for maintenance diagnostics and efficient service scheduling.

Since there is no set-top converter, subscriber access to disconnect or reconnect is no longer required. And your service people never have to get in to maintain, replace, or retrieve set-top converters.

Service calls are reduced because you no longer have

"bad picture" complaints caused by electromagnetic and radio frequency interference. TFC's fiber optic distribution network is immune to these disturbances.

To find out more about how the Mini-Hub System will slash your operating costs, contact TFC today at P.O. Box 384, Wallingford, CT 06492, (203) 265-8500.

TFC TIMES FIBER COMMUNICATIONS, INC.
An INSILCO Company



Wellflex FLC foam cable

conductor insures dimensional stability under extreme environmental conditions.

Weatherproof connectors have been designed by Cablewave for low VSWR and easy field installation. Cables are available in continuous lengths and are supplied with a black polyethylene jacket for improved handling and installation characteristics and for use in direct burial applications. Electrical specifications include: Frequency 5.0 GHz max.; 50 Ohm impedance; velocity of propagation, 88 percent.

For more information, contact Cablewave Systems Inc., (203) 239-3311.

Amplica Announces RD-10 Satellite Receiver

Amplica Inc. has announced the availability of the model RD-10 satellite receiver. The RD-10 receiver system is designed for those who prefer a separate downconverter component that interfaces with Amplica's new R-10 receiver and any quality LNA. For weak signal areas that need additional signal-to-noise margin, the RD-10 may be interfaced with Amplica's commercial-grade 80 degree K or 90 degree K LNA. The RD-10 receiver consists of a model D-10 downconverter and a model R-10 satellite

video receiver. The model D-10 comes in a weatherproof housing that can be used either indoors, or outdoors near the LNA. This single conversion unit converts a 4 GHz signal to 70 MHz for use with the R-10.

For more information, contact Amplica, (805) 499-2621.

Intercept Corp. To Introduce New Traps At Eastern Show

A wide selection of new, single- and multiple-channel video-and-audio or video-only parental control traps will be shown for the first time along with Intercept Corporation's new pay-TV tier traps at the Eastern Show.

Four new series of parental control traps will feature the industry's only key-lock trap using printed circuit board construction in a rugged, miniature enclosure. There are models for low, mid, high and superband channels, 2 through W. All units enable the lower adjacent channel to remain fully usable as a result of the extreme sharpness of the network.

Intercept's PTVA 40 series traps out both video and audio for any single channel. The PTV 100 series is also a single channel trap for video only. For two-channel trapping, video only, Intercept offers its PTV 200 series; and for three channels, video only, the PTV 300 series.

Among the new line's design and engineering features are 60 dB attenuation for complete signal degradation, RFI shielding, maximum resistance to shock damage and a five-disc tumble key lock with two keys. High-quality materials are used in construction to ensure long-term, maintenance-free operation. Installation requires no additional jumpers or splices.

To provide security on premium channels, Intercept will also introduce its new

pay TV tier trap series at the Eastern Show. The new traps do not affect the lower adjacent channel. According to the company, this characteristic is unequalled by any other trap.

Intercept tier traps are available in models for low, mid, high and superband channels 2 through W. Low and midband have 60 dB attenuation for complete signal degradation. Other design and engineering features include nickel-plated brass construction for durability and corrosion-resistance; complete encapsulation to inhibit moisture absorption; weather-tight "O" ring that seals outer sleeve; and printed circuit board construction for outstanding electrical performance and repeatability.

For more information on these and other products, contact Intercept Corporation toll-free, (800) 526-7452.



Chyron model VP-1 character generator

Chyron Announces New, Low-Cost Character Generator

The Cable/Video Division of Chyron Corporation, has introduced the Model VP-1, a low-cost character generator. According to the company, the VP-1 provides character generation and graphic capabilities with a superior resolution previously available only with costly and

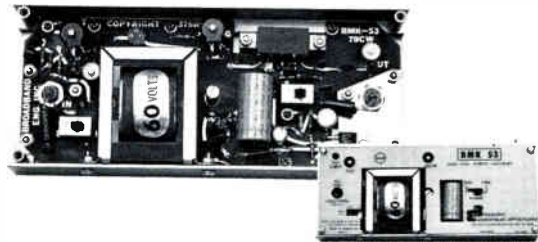
Upgrade your SLE line extenders with push-pull hybrid electronics - Broadband now offers the BMK-53 in ready-to install modules.*

With our BMK-53 now in ready-to-install modules, it's a relatively simple matter to upgrade your Jerrold® SLE-1, 20 2P line extenders to 300 MHz push-pull hybrid electronics. Another cost effective option from Broadband, it features:

- Push-pull hybrid electronics
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- 30 or 60 volt powering options
- 28 dB gain (standard module)
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- Three levels of surge protection
- 12 to 20 dB of equalization at 300 MHz

Pricing as low as \$99.50 for more than 50 pieces.

*Also available as a replacement assembly ready to install in your existing module.



For free specification sheets and pricing, call our toll-free number (800-327-6690) or write Broadband Engineering, Inc., P.O. Box 1247, Jupiter, Florida 33458.

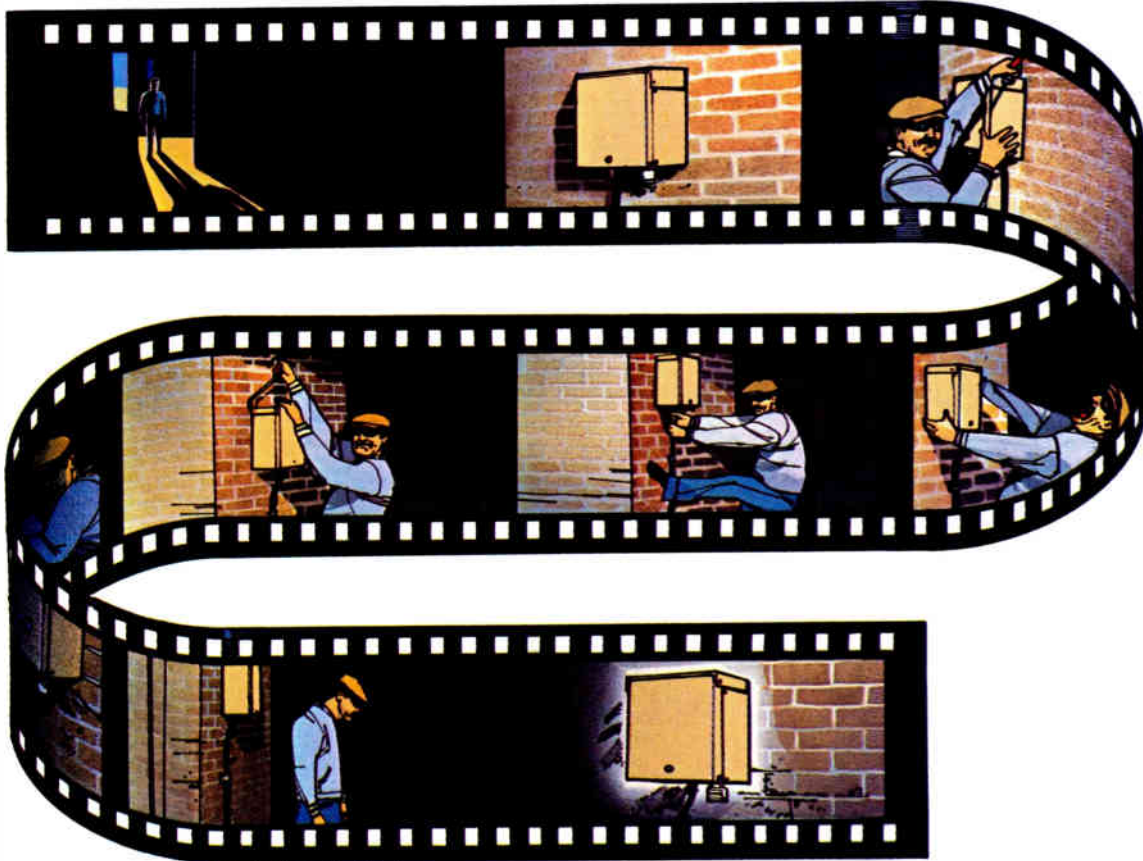
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See us at the Eastern Show at Booth 1261

USE OUR S.A.F.E.

SECURE ACCESS — FREE ENCLOSURE

MANUFACTURED FOR ANIXTER BY UTILITY PRODUCTS



STOP PAY-TV THEFT!

The S.A.F.E. is a Secure Access-Free Enclosure with built-in maximum security locking system designed to stop pay TV theft. Heavy-gauge steel and flange free construction are standard security features. A plywood backboard is included for easy mounting and knockouts are positioned on the top, bottom and back for cable entry.

For the right combination, there are five S.A.F.E.'s to choose from.

For more information, call our **ACTION-LINES** → toll free or collect.

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In an emergency, weekends and holidays or after 5 P.M., call toll free 1-(800) 323-8166.
CORPORATE OFFICES, ANIXTER BROS., INC. 4711 Golf Road, Skokie, IL 60076, (312) 677-2600

© 1982 Anixter Bros., Inc.

more elaborate studio character generators.

The VP-1 accepts serial data from an RS 232C communication interface which can be generated from any microprocessor utilizing a word processor program.

Some of the important features of the VP-1 are: 35 nanosecond resolution for ultra-sharp images; an 8-color palette out of a possible 64 colors; 6-font storage with new fonts from an extensive library; logo fonts; character edging; tilting, and more.

Chyron claims that a wide range of features and low price make the VP-1 the most versatile low-cost character generator on the market.

For more information, contact Chyron

Corporation, Cable/Video Division, 265 Spagnoli Road, Melville, N.Y. 11747.

Pay-TV Security Device Prevents Signal Theft

Viewsonics Inc. has recently developed an inexpensive security device, the Lockinator™, which helps prevent signal theft in pay TV.

The Lockinator™, is a diecast unit that locks in and terminates (75 ohm ³ 5 percent) unassigned signal ports on outdoor or indoor taps, splitters, wall plates, etc. It can be fitted to any device with standard 3/8 X 32 F ports.

A unique feature of the Lockinator is its concealed key entry system. The unit can be removed only with the Lockinator tool key which, according to the company, is virtually indestructible and guaranteed for life.

Viewsonics has a patent pending on the Lockinator and quotes a price range of 49 cents to 42 cents each for quantities over 50,000. The tool key is \$4.25 each but is offered free with every 2,000 Lockinators ordered.

For more information, contact Viewsonics Inc., (516) 921-7080.

M/A-COM Marketing 12 GHz Satellite Receiving Systems

M/A-COM Video Satellite Inc. has announced the availability of 13 GHz equipment for the CATV/SMATV applications and private communications networks.

Recent government deregulation of the 12 GHz satellite band allows reception of a multitude of services, including entertainment programming and private communications networks (including data transmission) using small-diameter antennas.

Systems at 12 GHz feature the performance, capabilities and functions of M/A-COM's 3.7 to 4.2 GHz satellite reception equipment.

M/A-COM's 12 GHz low-noise block downconverters (LNBs) are compatible with the MA-1001 and MA-1003 LNB satellite receivers and allow system upgrades at minimum cost. A typical four-channel system will use a small diameter antenna, two LNBs and four satellite receivers to provide four channels of reception, two each on horizontal and vertical polarization. According to the company, four-channel systems will cost as low as \$9,500.

The satellite receiver features 24-channel frequency agility using a synthesized local oscillator. The circuits in this receiver are standard M/A-COM designs, insuring quality video reception under marginal signal conditions.

For more information, contact M/A-COM Video Satellite Inc., (617) 272-3100.

Pico-Savac RF Metal Film For TVROs

Pico-Savac has developed a 100 percent reflective RF metal film for post application into existing and installed satellite antennas. By applying an optically smooth and 100 percent reflective metal to the tooled surface of any casted antenna, added contrast and gain is expected, along with improved rejection of off-axis noise.

These metal films feature a pre-primed metal surface for painting; a special weatherized pressure sensitive adhesive system for quick and permanent installation; and roll length and size for easy application. For more information, contact Pico-Savac, (813) 344-1634.

Don't sell cable security because you promised it. Sell it to make money.

Early cable security systems were notorious money losers, primarily because of high installation and maintenance costs. Operational problems caused by false alarms, in-home terminal adjustments, stuck transmitters, and just plain unreliability kept crews on the go. CableBus and the MICRO-2 have solved these problems. The MICRO-2 is reliable, easy to install and operate, and can handle 1,000 subscribers efficiently, effectively, and economically. Your initial investment is under \$10,000.

As the industry leader in cable security, we can offer you proven equipment, not prototypes. We've been shipping systems for two years and have more in actual operation than anyone else. Typically, a standard-frequency system is shipped in 30 days.

Then, when you have more subscribers than your MICRO-2 can accommodate, we'll allow you up to 100% trade-in on a larger system.



CableBus[®]
SYSTEMS CORPORATION

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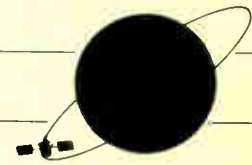
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Lowest Loss - Lowest Cost - Any System Design



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Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders	Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders
ARTS		9:00 p.m. - 12:00 a.m.		Satcom III-R #1	HBO		24 hrs	Program 729*/# Scramble 835*/# Duplication 940*/#	Satcom III-R #24 (E.C.) Satcom III-R #13, #22 (M.P.)
ACSN	Weekdays Weekends	6:00 a.m. / 4:00 p.m. 6:00 a.m. / 1:00 p.m.	192*/#	Satcom III-R #16	HTN		8:00 p.m. / 2:00 a.m.	207*/#	Satcom III-R #21 (P)
BET	Daily	11:00 p.m. - 2:00 a.m.	018*/#	Satcom III-R #9	HTN Plus	Daily	4 p.m. / 4 a.m.		Satcom III-R #16
Bravo		8:00 p.m. / 6:00 a.m.		Satcom IV #6	The Movie Channel		24 hrs	None	Satcom III-R #5
CBN		24 hrs	None	Satcom III-R #8	Modern Satellite Network	Weekdays	10 a.m. / 1 p.m.	243*/#	Satcom III-R #22
CBS Cable		4:30 p.m. / 4:30 a.m.	524*/#	Westar IV #3D	MTV: Music Television		24 hrs	None	Satcom III-R #11
Cinemax		24 hrs	None	Satcom III-R #20 (E.C.) Satcom III-R #23 (M.P.)	National Christian Network		6:00 a.m. / 8:00 p.m.	073*/#	Satcom IV #7
CNN		24 hrs	None	Satcom III-R #14	National Jewish Television	Sundays	1 p.m. / 4 p.m.		Satcom III-R #16
CNN2		24 hrs	None	Satcom III-R #15	Nickelodeon		8:00 a.m. / 9:00 p.m.	311*/# (E.C.M.) 519*/# (P)	Satcom III-R #1
C-SPAN	Daily	9 a.m. / 1 a.m.		Satcom III-R #19	North American Newstime		24 hrs	None	Satcom III-R #6
Daytime	Weekdays	1 p.m. / 5 p.m.		Satcom III-R #22	PTL		24 hrs	None	Satcom III-R #2
ESPN		24 hrs	None	Satcom III-R #7	Preview Channel	Weekdays	10:00 a.m. - 1:30 p.m.	207*/#	Satcom III-R #21
Eros	Thurs -Sat	10 p.m. / 2 a.m.		Westar IV #10D	Reuters	Weekdays	4 a.m. / 8 p.m.	None	Satcom III-R #18
Escapade		8:00 p.m. / 6:00 a.m.		Satcom IV #7	SIN		24 hrs	None	Westar IV #3x
Eternal World Television Network		7:00 p.m. / 11:00 p.m.		Westar IV #10D	SPN		24 hrs	None	Westar IV #11x
GalaVision	Weekdays Weekends	11 p.m. / 11 a.m. 24 hrs		Westar IV #12D	Showtime		24 hrs	None	Satcom III-R #12 (E.C.) Satcom III-R #10 (M.P.)

Major Communications Satellites Serving North America		
Location: Degrees West Longitude	Satellite	
	Present	Future
70		Southern Pacific-2 (Oct. 84)**
74		Galaxy-2 (Mid 84)
79		Advanced Westar-2**
83	Satcom-4	
87	Comstar-D3	Telstar-2
91	Westar-3	Advanced Westar-1**
94		SBS-3**
95	Comstar-D2 & D1	Telstar-1
97	SBS-2*	
99	Westar-1	Westar-4 (Mid 82)**
100	SBS-1*	
103		GTE-1*
104		Anik-C (Mid 82)
106		GTE-2*
109	Anik-B**	
114	Anik-2 & 3	
119	Satcom-2	Southern Pacific-1 (Feb. 84)**
123	Westar-2	Westar-5 (Early 83)
127		Comstar-D4 (Mid 82); Telstar-3 (1986)
131	Satcom-3R	
135	Satcom-1	Galaxy-1 (Mid 82)
139		Satcom-1R (Mid 83)
143		Satcom-2R (1984)

*Ku Band	WTBS	24 hrs	None	Satcom III-R #6
**Dual Ku/C Band	The Weather Channel	24 hrs	None	Satcom III-R #21

E= eastern M= mountain
C= central P= pacific

Alert tones listed are for sign-on, sign-off.

All program times are listed for the eastern time zone, unless otherwise noted.

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*CE-D Product Profile November 1981

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